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Research Document 2005/072 | **Document de recherche 2005/072**

Year Eight of the NAFO Subdivision 3Ps Fall GEAC Surveys: Catch Results for Atlantic Cod (Gadus morhua), American Plaice (Hippoglossoides platessoides F.), Witch Flounder (Glyptosephalus synoglossus L.), and Haddock (Melanogrammus aeglefinus)

Huitième année des relevés d'automne du GEAC dans la sous-division 3Ps de l'OPANO : Résultats concernant les prises de morue (Gadus morhua), de plie canadienne (Hippoglossoides platessoides F.), de plie grise (Glyptosephalus synoglossus L.) et d'aiglefin (Melanogrammus aeglefinus)

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ISSN 1499-3848 (Printed / Imprimé)

Canada

SUMMARY

To enhance the fisheries research database in NAFO Division 3Ps, the Groundfish Enterprise Allocation Council (GEAC) has funded surveys each fall from 1997 to 2004 directed at groundfish, with specific interest in cod, American plaice, witch flounder, and haddock. In this analysis, catch statistics, length and age distribution, and stratified analysis estimates of biomass, including age distribution estimates, and interpretation of results are presented. These results have also been presented annually during the regular Regional Stock Assessment Meetings (RAP) in St. John's.

There was a noticeable lack of large cod catches in the 2004 survey which in turn yielded a total abundance estimate of 6.6 million cod, and a total biomass estimate of 23 ktonnes: the lowest estimates of the eight year survey. Plaice catch numbers and weights were down slightly from 2003 but were comparable to 2002. The abundance estimate of 23.1 million was down 10% from that in 2003, while the biomass estimate of 19 ktonnes was down 25% from 2003. Witch catch numbers and weights were down slightly from 2003 but remained comparable to the 2002 values. The estimated abundance of 5 million was down 28% from the 2003 estimate of 7.1 million, and the estimated biomass of 2.6 ktonnes was down 14% from the 2003 estimate of 3 ktonnes. Finally, haddock catch numbers and weights were down from 2003 by a factor of two to three. The abundance estimate of 1.2 million haddock and biomass estimate of 2.3 ktonnes were the lowest estimates since 1999.

RÉSUMÉ

Pour améliorer la base de données de recherche sur les pêches dans la sous-division 3Ps de l'OPANO, le Groundfish Enterprise Allocation Council (GEAC) a financé des relevés effectués chaque automne, de 1997 à 2004. Ces relevés dirigés vers les poissons de fond étaient principalement axés sur la morue, la plie canadienne, la plie grise et l'aiglefin. Cette analyse présente des statistiques sur les prises, des données relatives à la répartition selon la longueur et l'âge, des estimations par analyse stratifiée de la biomasse, y compris des estimations de la répartition selon l'âge, ainsi qu'une interprétation des résultats. Ces résultats ont également été présentés annuellement dans le cadre de réunions régulières sur l'évaluation des stocks (processus consultatif régional – PCR) tenues à St. John's.

Le peu de grosses morues est flagrant dans les prises constatées dans le relevé de 2004. Selon ce relevé, l'abondance totale des morues a été estimée à 6,6 millions d'individus et la biomasse totale, à 23 kilotonnes, les plus faibles estimations issues des relevés échelonnés sur huit ans. Le nombre des prises de plies et leur poids ont été légèrement à la baisse par rapport à 2003, mais ils sont demeurés comparables à ceux de 2002. L'abondance des plies, estimée à 23,1 millions d'individus, a été intérieure de 10 % par rapport à celle de 2003, tandis que la biomasse, estimée à 19 kilotonnes, a été inférieure de 25 % par rapport à celle de 2003. Le nombre de prises de plies grises et leur poids ont été aussi légèrement à la baisse par rapport à 2003, mais ils sont demeurés comparables aux valeurs enregistrées en 2002. L'abondance, estimée à 5 millions d'individus, a été à la baisse de 28 % par rapport à celle de 2003, qui se chiffrait à 7,1 millions, tandis que la biomasse, estimée à 2,6 kilotonnes, a été aussi inférieure de 14 % par rapport aux 3 kilotonnes estimées en 2003. Enfin, le nombre des prises d'aiglefins et leur poids ont été de deux à trois fois plus inférieurs à ceux observés en 2003. L'abondance des aiglefins, estimée à 1,2 million d'individus, et leur biomasse, estimée à 2,3 kilotonnes, ont été les plus faibles estimations enregistrées depuis 1999.

INTRODUCTION

To enhance the fisheries research database in NAFO Division 3Ps, the Groundfish Enterprise Allocation Council (GEAC) has funded surveys each fall from 1997 to 2004 directed at groundfish, with specific interest in cod, American plaice, witch flounder, and haddock. The intent has been to create a series of annual fall surveys in 3Ps to complement current resource assessment activities carried out by the Department of Fisheries and Oceans (DFO). GEAC funded and performed the surveys with scientific guidance from DFO in the design and execution of a stratified random survey and the associated sampling. The data collected during these surveys have been subsequently analysed on behalf of GEAC and for the additional intent of providing this information to DFO, for their databases and their assessment work. These results have been presented annually during the regular Regional Stock Assessment Meetings (RAP) in St. John's. Companion CSAS Research Documents have been prepared previously each year, separately, for each species analysed in these surveys. With the 2004 survey, the analyses of all four species are presented under the cover of one Research Document. One trip to perform the 2004 survey was carried out from December 1 to 14 2004. These dates correspond well with the late-November and December time periods for the previous seven years. During the trip, set details and length frequencies were logged in the DFO FFS system and otoliths were collected for subsequent aging. Catch statistics, length and age distribution, and stratified analysis estimates of biomass, including age distribution estimates, and interpretation of results are presented separately for cod, plaice, and witch. A similar analysis without the length or aging information is presented for haddock.

Under contract to GEAC, AMEC has taken the data logged using the DFO FFS system, combined with the aged otiliths, created digital data files appropriate for inclusion in the DFO (VAX computer system) databases, and performed a first analysis of the survey results. This document presents these results.

This resdoc presents the analysis for each of the four species, one species at a time: cod, plaice, witch, and finally haddock. Following a review of methods and materials and an overview of the survey gear net performance, results are presented as follows:

Cod: Figures 3-11, Tables 1-4, pages 4-7.
Plaice: Figures 12-19, Tables 5-8, pages 7-9.
Witch: Figures 20-27, Tables 9-12, pages 9-11.
Haddock: Figures 28-33, Tables 13-15, pages 11-12.

Methods and Materials

A Stratified Random survey was carried out in 3Ps by the *M.V. Pennysmart*. A summary of the trip is presented below.

Trip 9: Stratified Random Survey
Trip 9 was carried out from 1 to 14 December 2004. This time period is consistent with the 1997-2003 stratified random survey sets. The *Pennysmart*, the same boat

as in the previous surveys, sailed from Marystown for operation in 3Ps, St. Pierre Bank, Halibut Channel, and Green Bank. Figure 1 shows a map illustrating the location of the strata surveyed. The survey was directed at cod, American plaice, witch flounder, and haddock. Set details were collected for all species caught: length, sex, and otolith information were sampled for the cod, plaice, and witch. Weather and sea conditions were generally favourable with the result that no survey time was lost due to weather. Near the end of the survey cod tagging was conducted during 15 sets (numbers 89-103): these are excluded from this survey analysis. Three sets were unsuccessful:

- set 35 was unsuccessful due to rough bottom in the area and not repeated
- set 45 was cut short because of fixed gear in the area
- set 72 was unsuccessful after the net hooked on bottom 11 minutes into the tow

A total of 86 successful sets were completed. This is comparable to the number of successful sets in previous years which range from 73 to 91 and average 83.

Tows of duration 30 minutes using an Engels 96 high lift trawl with a 135 mm diamond mesh cod end (not lined) were conducted. The trawl was fitted with rock hopper foot gear and Bergen #7 trawl doors. The 30 minute tows were commenced once the net reached the bottom.

Performance of the trawl was checked onboard using SCANMAR sensors: bridge display of doorspread and net opening (headline height) was visually monitored and these measurements together with trawl depth and water temperature were noted every five minutes on the written bridge log for most sets. Wingspread was not measured for this trip. The doorspread, clearance, and opening measurements as well as temperature were logged to computer disk using Seatrawl software. The trawl gear and configuration were identical to those used in the 1997-2003 surveys.

Data were logged using FFS with the length and otolith sampling carried out on board. The resulting ages were input to create an age and growth digital file.

Shore-based Analysis

The set details and length frequencies for cod, plaice, and witch were exported from FFS to create ASCII data files. The age and growth data were keyed in following completion of the otolith aging. Cod, plaice and witch were all sampled in 1 cm length groupings, and all ratio/percentages of catch measured were applied. As noted, there was no haddock age or length information collected.

Gear Performance

The survey gear performance was monitored with SCANMAR units mounted on the net. Measurements were digitally logged every 5 seconds with the DFO Seatrawl software and typically noted every 5 minutes on the bridge log. Doors, opening, and clearance, as well as temperature and depth were recorded for most sets. There was no measurement of wingspread for this survey. The digital

Seatrawl data were subsequently processed using the new AMEC NetPlot Windows software developed for DFO as a Seatrawl data processing and viewing tool.

Statistics were computed from the data with application of typical range checks, in this instance, doorspread in [0,150 m], opening and clearance in [0,50 m]. Digital data coverage was good with doorspread logged for 77 of the 86 successful sets, and opening and clearance logged for 74 of the 86 sets.

Figures 2a and 2b present these derived net doorspread and opening statistics for each set. The mean +/- one standard deviation are shown. The mean doorspread is 89 m compared with means in the range 71 to 78 m from 1999 to 2003. Mean opening in 2004 is 3.8 m compared with means of 4.4 m in 2003 and 5.0 to 5.4 m for 2000 to 2002. Computation of the 2004 statistics was with the new NetPlot software compared with a traditional Seatrawl software processing stream: this may explain some of the differences.

There are about 10 sets with mean doorspread less than 60 m, and about 10 sets with means of 120 m or greater, generally all for the deeper sets. The median doorspread is 95 m. In general, the greater the depth, the greater the doorspread (Figure 2d). Except for one set 46 with a mean opening of 11 m, mean values are all in the range 1.3 to 5.6 m.

Figure 2c presents the clearance statistics. The mean clearance is 0.16 m compared with values near 0.5 m from 2001 to 2003. Except for one set 71 that was of shorter 19 minute duration and had a mean of 1.86 m, mean clearances are all in the range 0 to 0.46 m.

Figures 2d presents the mean doorspread versus set depth. The average mean set doorspread is 79 m for sets in depths less than 150 m and 97 m for sets in greater depths.

As noted, wingspread was not recorded. Recent mean values though the three years previous have been on the order of 16.4 to 18.5 m (approximately 60 ft).

There appears to be good consistency in the net performance opening and clearance measurements for most of the sets, although for some periods of the survey, e.g. sets 34 to 47, the variability in doorspread appears to be higher than is desirable. It is essential that the net performance should be carefully monitored in the future.

The vessel and gear are the same as previous years and there is nothing apparent in the 2004 survey measurements to suggest a drastic change in net performance. It is unfortunate there was no measurement of wingspread. Nevertheless, a more detailed comparison of net performance and mensuration should be undertaken in the future. For the present though, the assumption is made here to use the same 60 ft wingspread value for the stratified analysis that has also been used for the other years. This is appropriate for preserving the seven or eight year relative index of abundance for each species.

For each species, abundance and biomass were estimated using the DFO stratified analysis STRAP software and applying the French Exclusion Zone around St. Pierre et Miquelon for area calculations. Consistent with all survey analyses since 1997, a wingspread of 60 feet was used.

Results and Discussion: Cod

ACON plots of the spatial distribution of catch weights are presented in Figure 3 and include the corresponding catch results from the 1997-2003 surveys. As has been the historical pattern for the survey, the largest catches were located at the southern entrance to the Halibut Channel and on the western portion of St. Pierre Bank. In 2004, the set catch weights of 100 kg or greater are fewer in number and smaller in magnitude.

Table 1 presents a summary of the cod set details and catch numbers and weights. The mean cod catch for the 86 stratified random sets is 10 fish and the mean catch weight is 31 kg. This is down noticeably compared with 45 and 136 kg in 2003, 47 and 114kg in 2002, 48 and 90 kg in 2001 and 72 and 370 kg in 2000). The total number of cod caught was 872 in 2004 compared with 3,982 in 2003, with 3,543 in 2002, 4,340 in 2001 and 5,247 in 2000. The total catch weight was 2697 kg in 2004 compared with 12101 kg in 2003, 8,571 kg in 2002, 8,195 kg in 2001 and 26,992 kg in 2000. The largest catch of 258 cod and weight 697 kg was from set 47 in stratum 319 at a depth of approximately 166 m at the mouth of the Halibut Channel. There is a noticeable absence of the traditional large catches in strata 318 and 319.

Figures 4a to 4c show summaries of the total and maximum number of cod caught, the total and maximum cod weights, and the largest catch weights over the survey years, respectively. Evident in Figures 4a and 4b are the reductions in numbers and weight of cod which are less than one third of their 2003 values.

Figure 4c shows the largest sets for each of the eight survey years. The largest sets in four of the years are greater than the 5000 kg scale shown: the largest sets in 1998, 2000, 2002, and 2003 are 8035 kg, 17083 kg and 5007 kg, 7020 kg, and 8330 kg respectively. For 2004, there is an absence of at least one or two large sets which has generally been the norm for the previous years.

Cod Age and Length Composition

Figures 5a and 5b present the sampled length compositions of the first four and most recent four survey years. In 2004 the sampled lengths are generally between about 43 and 80 cm with a peak if the distribution at 58 cm, compared with 2003 where lengths are largely from 50 to 80 cm and peak at 69 cm. In 2004 there are more smaller fish in the 43 to 59 cm range than in 2003 and similar to 2002.

Figures 6a to 6d present age composition of the 2004 sampled cod. Figure 6a presents length versus age distribution. The mean sampled length from the aged cod was 66 cm almost identical to the 67 cm in 2003. Mean lengths for 1997 to 2002 were 63.5, 68.8, 63.9, 70, 65 and 62.9 cm respectively. The maximum lengths sampled for years 1997 through 2003 were 103, 118, 108, 116, 111, 114

and 115 cm. The mean sampled age for 2004 was 6 years compared with 6.1 years in 2003. Mean ages for 1997 to 2002 were 5.8, 6.4, 6.1, 6.6, 6.1 and 5.4 years respectively. The maximum ages sampled for 1997 through 2004 were 12, 15, 13, 14, 16, 13, 15, and 16 respectively. Figure 6b shows the percent occurrence of cod sampled at each age for the seven years. The low representation of the weak 1991 year class is evident in all years as ages 6 through 13 for years 2004 to 1997 respectively. The proportion of age 6 cod in 2003 and 2004 are comparable. The proportion of age 7 cod in 2004 is more than double that for 2003 and 2002 and is comparable with values in 2000 and 2001.

There were few sampled fish in 2004 older than 8 years. Figure 6c presents the sampled numbers of fish at age, stacking the total numbers from each year in the bars. Figure 6d shows the greatest percentage of cod in 2004 being age 6 and 7, the highest percentage of age 6 cod for the survey years, and the age 7 cod percentage comparable with the 1997 survey. A total of 456 otoliths were taken in 2004 compared to the 491 in 2003, 502 in 1997, 450 in 1998, 551 in 1999, 678 in 2000, 607 in 2001, and 422 in 2002.

Cod Abundance and Biomass Estimates

Table 2a presents the STRAP output of estimated abundance and biomass. The estimated total number of cod for 3Ps is 6.6 million (with 95% confidence upper limit of 13.5 million). The mean number of cod per standard 1.5 nautical mile tow is 8 fish (with upper limit of 16). The estimated total cod biomass is 23 ktonnes (with upper limit of 45 ktonnes). The mean catch weight per tow is 27 kg.

Table 2b presents a summary comparison of these abundance and biomass STRAP estimates for 1997 to 2004.

The 2004 abundance estimate of 6.6 million is 30% of the estimate of around 22 million from 2003. The biomass estimate of 23 ktonnes is about one third that of 2003 and is the lowest value from any of the survey years. The mean number of fish per set for 2003 is similarly about half that from 2000 to 2002. The mean catch weight per set in 2003 is similarly down to one third of the 2003 estimate. There are large variances to the estimates in some years which yield negative lower limits: zero values are shown in the tables. Large variances can result when there are large differences in the catch sizes obtained for the different sets fished in a given stratum.

Table 3a presents the STRAP age composition of numbers per tow, with sexes combined. The total mean number per tow is 7.6 with the greatest numbers expected at ages 6 (3 fish per tow), 7 (1.2 fish) and 5 (1.1 fish). Ages 3 and 4 have estimates of about 0.7 and 0.8 fish per tow. For the other ages, estimates are 0.2 fish or less. Table 3b presents a comparison of the estimated abundances and mean numbers of fish per tow for 1997-2004. While the age 6 estimates are the largest of the 2004 survey, the 2.6 million cod estimate is still less than one third of the 2003 estimate. The 2004 age 3 and age 7 estimates are comparable to those from 2004 but otherwise all the 2004 age estimates are down from 2003.

Tables 4a and 4b present the cod abundance and biomass estimates by strata for 1997 to 2004, arranged by depth regime. The overall abundance estimate (Table 4a) of 6.6 is 30% of the 21.9 million value from 2003. There is a large reduction in the numbers estimated for strata less than 30 fathoms and the 101 to 150 fathom grouping. Slightly greater numbers are seen in 2004 compared with 2003 for the 31 to 100 fathom range. A similar pattern is shown in Table 4b with the biomass estimates.

Figure 7 shows a 3d histogram of the abundance estimates by age for all survey years. The growth of age 3, 4, and 5 age cod for example in 2001 through to 2004 is evident; however, the numbers are reduced in recent years, particularly for 2004.

Figure 8 presents the STRAP-estimated abundance at length values for all sexes combined. From 1997 to 1998 the data indicate a "bottoming out" of sorts, and in 2000 there was a visible increase in the length distribution peak from 1998 to 1999 to 2000, a consistent increase of approximately 6 cm each year from 61 cm in 1998 to 67 cm in 1999 to 73 cm in 2000. This increase disappeared in 2001 with there being few fish over 65 to 70 cm in length. There was evident growth from 2001 to 2002 with the peak located at 49 cm in 2001 and at 61 cm in the 2002 survey. In 2003, the peak is at 67 cm although the magnitude of the peak there is less than half the 2002 values. In 2004, the distribution is much reduced from 2003 or 2002 and more in line with the lower distribution of 1998.

Figures 9 and 10 present 3d histograms of the abundance and biomass estimates grouped by strata for all years. The reduction in numbers for either of the traditionally well-represented strata 318 and 319 at the mouth of the Halibut Channel is evident. Figure 11 compares the abundance and biomass estimates by considering totals with all strata and without the two strata 318 and 319. The ratios of 2003 to 2004 estimates indicate that while these two strata historically contribute a significant amount to the total, the numbers are still reduced by at least a factor of two.

Cod Summary

In summary, the 2004 survey yields a total abundance estimate of 6.6 million cod, and a total biomass estimate of 23 ktonnes. These estimates are the lowest in the eight year survey time series. There was a noticeable lack of large catches in the 2004 survey which in turn yielded the greatly reduced abundance and biomass estimates. The numbers of cod for year classes 1998 and 1997 (ages 6 and 7 in 2004) are down about four times from that estimated in 2003. These fish (the 1998 and 1997 year classes) accounted for about 70% of the total in 2003 and 55% in 2004. 35% of the 2004 total is from ages 3 to 5.

Results and Discussion: Plaice

ACON plots of the spatial distribution of American plaice catch weights are presented in Figure 12 and include the corresponding catch results from the 1998-2003 surveys. 2004 shows a catch distribution similar to the previous years with catches located along the western and southwestern slopes of the St. Pierre Bank and at the southern entrance to the Halibut Channel. The largest catch was set 55

with 955 plaice and a set catch weight of 908 kg. The set was located in stratum 317 in a water depth of 138 m on the western portion of St. Pierre Bank just south of 46° N and west of the French Exclusion Zone corridor: the second largest set, set 56 (772 plaice, 704 kg), was located immediately nearby.

Table 5 presents a summary of the plaice set details and catch numbers and weights. The mean plaice catch for the 86 stratified random sets is 39 fish and the mean catch weight is 33 kg. These numbers are similar to those from 2003 (30 fish and 29 kg) and 2002 (37 fish and 27 kg) and lower than those from the earlier 1999, 2000, and 2001 surveys (mean values of 55, 53, and 63 fish and mean catch weights of 36, 37, and 39 kg respectively). A catch of plaice was reported in 70 of the 86 successful sets. A total of six sets had catches over 100 kg, with three sets over 200 kg.

Figures 13a to 13c show summaries of the total and maximum number of plaice caught, the total and maximum plaice weights, and the largest catch weights over the survey years, respectively. The numbers are generally very consistent with the previous two years 2002 and 2003. The set totals and largest set values in 2004 are increased slightly from 2003.

Length and Age

Figures 14a and 14b present the sampled length compositions for all survey years. For 2004, the fish sampled range in size from 20 cm up to 69 cm. The distribution shows a peak at 38 cm below the sampled mean of 42 cm. The shape of the distribution in 2004 is similar to previous years although the magnitude of the peak is less than in 2002 and 2003. The numbers of larger plaice of length 50 to 60 cm is comparable to that from the 2003 survey and is slightly greater than 2001 and 2002 for example.

Figures 15a and 15b present age composition of the 2004 sampled plaice. Figure 15a presents length versus age distribution. The mean age of 751 sampled plaice was 10 years, the same as in 2003 and 2002 and compared with 9.6 in 2001 and 9.5 years in 2000. The youngest and oldest fish were 3 and 19 years.

Figure 15b presents a bar chart of the sampled numbers of plaice at age for all years. The number of sampled plaice in 2004 is comparable to that from the previous years and the overall shape of the age distribution remains consistent (See also Figure 16.) In 2004 the proportions of age 6 and 7 plaice are increased from those in 2003, while the proportions of ages 5 and 9 are somewhat less than for 2003. The numbers of older fish sampled in 2004 are generally at least as frequent as the other survey years.

Stratified Analysis

Table 6a presents the STRAP output of estimated abundance and biomass. The estimated total number of plaice for 3Ps is 23.1 million (with a 95% confidence upper limit of 34.5 million). The mean number of plaice per standard 1.5 nautical mile tow is 27. The estimated total plaice biomass is 18.8 ktonnes. The mean catch weight per tow is 22 kg.

Table 6b presents a summary comparison of abundance and biomass STRAP estimates for all years. The 2004 total abundance and mean number of fish per tow estimates are quite comparable to those from 2002 and 2003. The 2004 biomass estimates is 75% of the 2003 estimate but is comparable to the estimate from 2002.

Table 7a presents the STRAP age composition of numbers per tow, with sexes combined. The total mean number per tow is 26.6. The greatest numbers expected are at ages 10 (4.6 fish per tow), 7 (3.7 fish). Lesser numbers of fish (2.4 to 3.2 fish per tow) at the other ages from 6 to 12 are expected.

Table 7b presents an age summary comparison of abundance STRAP estimates. The number of age 7 fish for 2004 is double that for 2003, while for ages 6 and 11, the 2004 estimated numbers are up slightly. Conversely, the number of age 9 fish, and fish 14 and older is about half that from 2003. For most other ages the 2004 and 2003 estimates are generally comparable.

Tables 8a and 8b present the plaice abundance and biomass estimates by strata for all seven survey years, arranged by depth regime. Consisted with 2002, most of the plaice are estimated to be present in the three depth regimes shallower than 100 fathoms. In 2004 there are fewer fish in the shallow less than 30 fathom regime than in 2003, although the 2004 estimate of 4 million plaice is larger than the corresponding total for the years 2002 and 2001 before that. The greatest proportion of estimated plaice for the survey, just over half the total estimate, is located in the 51 to 100 fathom regime. This is more in keeping with the distribution seen for the survey years prior to 2003. The biomass estimates shown in Table 8b illustrate a similar picture: the other observation to make is that for the shallow (less than 30 fathom) regime, in 2004 the abundance estimate is 56% that for 2003, while the 2004 biomass estimate is just 40% that for 2003.

Figure 16 shows a 3d histogram of the abundance estimates by age for all survey years. The age distribution shows a general consistency through all years and a consistent total abundance for the past three years.

Figure 17 presents the STRAP-estimated abundance at length values for all sexes combined. The general shape of the distribution more closely resembles that from 2002 than 2003: lesser numbers of fish longer than about 40 cm are evident in the 2004 survey. Conversely there are greater numbers estimated for fish smaller than 40 cm. The 2004 peak is at 38.5 cm.

Figures 18 and 19 present 3d histograms of the abundance and biomass estimates grouped by strata for all years. As presented in Tables 8a and 8b, the general patterns of strata with greatest numbers in each of the first three depth regimes is seen consistently for the past three years.

Plaice Summary

In 2004, the plaice catch numbers and weights were down somewhat from 2003 but were comparable to 2002. The abundance estimate of 23.1 million was down 10% from that in 2003, while the biomass estimate of 19 ktonnes was down 25% from 2003. Less variance in the catch sizes and estimates was seen in 2004. The primary locations for plaice continue to be along the western portion of the St. Pierre Bank and at the entrance to Halibut Channel.

Results and Discussion: Witch

ACON plots of the spatial distribution of catch weights are presented in Figure 20 and include the corresponding catch results from the 1998-2003 surveys. The 2004 survey shows most catches located along the slopes of the St. Pierre Bank, southwest of St. Pierre and south to the Halibut Channel, and in water depths typically between about 150 and 400 m. The largest catch in the 2004 survey was 155 witch weighing 91 kg located in stratum 708, at the southern tip of St. Pierre Bank in a water depth of 374 m.

Table 9 presents a summary of the witch set details, catch numbers and weights. A total of 928 witch with total weight 437 kg were caught. Witch was caught in 40 of the 86 sets. About half of these sets were of 10 witch or less. This general pattern is similar to previous years.

Figures 21a to 21c summarize the total and maximum number of witch caught, the total and maximum witch weights, and the largest catch weights over the survey years, respectively. The numbers are generally down slightly from 2003 but comparable to or slightly greater than the 2002 catch statistics. In 2004, as shown in Figure 21c, while the three largest sets are less in magnitude than their 2003 counterparts, the values again are similar to those from 2002, and, the sizes of the fourth through eighth largest sets are larger than the 2003 or 2002 counterparts so that the survey contains several sets of magnitude.

Length and Age

Figures 22a and 22b present the length composition of the 2004 survey together with the first three and most recent three surveys years. For 2004, the sampled fish ranged in size from 26 cm up to 56 cm, with a mean length of 40 cm. The distribution itself shows two peaks at 38 and 42 cm. The overall shape is quite similar to recent years although the distribution shows slightly greater numbers of fish at lengths below (e.g., 32 cm) and above (e.g., 47 cm) the mean and the peak itself is not as high.

Figures 23a and 23b present age composition of the 2004 sampled witch. Figure 23a presents length versus age distribution. The mean age of 471 sampled witch was 9 years comparable to the other years. The mean was 8.8 in 2003, 8.7 in

2002, 9.1 years in 2000 and 2001, 8.9 years in 1999, and 8.8 years in 1998. The youngest and oldest fish sampled were 5 and 14 years.

Figure 23b presents a bar chart of the sampled percent occurrence of witch at age for 1998 to 2004. The numbers of sampled witch are not the same for each survey year, although for the past four years the number is comparable. Considering 2001 to 2004, the numbers at ages 6 through 10 are virtually identical. There are fewer witch of age 5 in 2004 compared to the previous three years. The numbers of age 11 and 12 are comparable.

Stratified Analysis

Table 10a presents the STRAP output of estimated abundance and biomass. The estimated total number of witch for 3Ps is 5 million. The mean number of witch per standard 1.5 nautical mile tow is 5.8. The total biomass is 11 ktonnes and the mean catch weight per tow is 3 kg. Table 10b presents a summary comparison of abundance and biomass STRAP estimates. Estimates for 2004 are down slightly compared to 2003 (abundance estimate is down 28% from 2003; biomass estimate is down 13%) but are very comparable to the estimates from 2002. The upper and lower limits continue to reflect considerable variance in the estimates.

Table 11a presents the STRAP age composition of numbers per tow, with sexes combined. The total mean number per tow is 5.8. The greatest numbers expected are at ages 9 (1.4 fish per tow), 8 (1.3 fish), 10 (0.9 fish) and 7 (0.8 fish). Table 11b presents an age distribution summary comparison of abundance STRAP estimates for all years. Estimates are down by up to one half for ages 8, 9, and 10 compared with 2003 but are quite comparable for the other ages from 6 through 13. Estimates in 2004 for all ages are very comparable to those from the 2002 survey.

Figure 24 shows a 3d histogram of the abundance estimates by age for all survey years. The age distribution shows a remarkable consistency through all years and a total abundance estimate in 2004 down slightly compared to 2003 as noted but quite comparable to the 2002 estimate.

Tables 12a and 12b present the witch abundance and biomass estimates by strata, for all years, arranged by depth regime. The distribution in 2004 shows numbers in the 151-1200 fathom regime are about 20 to 25% that of those from 2003, but are otherwise in keeping with the other survey years. The largest change in the 2003 survey appeared to be in the two deepest regimes where about 50% of the numbers and biomass were estimated to occur. Historically these two regimes accounted for about 25 or 30% or less of the total estimates. It is possible that temperature conditions affected the distribution in 2003 with the increased numbers in the deeper strata. In 2004, about 34% of the total abundance estimate and 40% of the total biomass estimate where located in the two deepest regimes.

Figure 25 presents the STRAP-estimated abundance at length values for all sexes combined for all seven survey years. The 2004 estimated length distribution is quite similar to that from 2002 and 1998. Figure 25 is particularly illustrative of the

three witch distribution patterns seen in the surveys: one from 2000, 2001, and 2003; a second in 1998, 2002 and now 2004; and the year effect in 1999.

Figures 26 and 27 present 3d histograms of the abundance and biomass estimates grouped by strata for all years. As presented in Tables 12a and 12b, the general patterns of strata with greatest numbers in the four deepest depth regimes is seen consistently for the past three years. Most the estimates are from strata 317/319 in the 51-100 fathom regime, strata 313/318 from the 101-150 fathom regime, and 707/708 from the two deepest regimes 151-200 and 201-300 fathoms.

Witch Summary

In 2004, the witch catch numbers and weights were down slightly from 2003 but remained comparable to the 2002 values. The estimated abundance of 5 million was down 28% from the 2003 estimate of 7.1 million, and the estimated biomass of 2.6 ktonnes was down 14% from the 2003 estimate of 3 ktonnes. The distribution of witch ages and lengths seen remains consistent as does the primary catch locations along the western slopes of St. Pierre Bank and near the entrance to Halibut Channel. Catches are almost exclusively in depths greater than 50 fathoms.

Results and Discussion: Haddock

ACON plots of the spatial distribution of catch weights and numbers are presented in Figures 28a and 28b. In virtually all years, the haddock catches are located primarily at the southern entrance to the Halibut Channel and in lesser magnitudes on the western portion of St. Pierre Bank, just west and southwest of St. Pierre et Miquelon. Many of the remaining sets in the surveys had no haddock. This pattern is generally consistent over time. There is a great similarity for example between the 2002 and 2004 maps.

Table 13 presents a summary of the haddock set details and catch numbers from the 2004 survey. A summary of set catch numbers and weights for all survey years is presented in Table 14. For each of the survey years, the survey trip dates and numbers of sets, number of sets with haddock, and the maximum, mean, and total numbers and weights are reported. On average at least one haddock was caught in 11 sets each survey trip as was the case in 2004. In 2004, seven of the 11 sets with haddock are of a single haddock: weights ranging from 1.5 to 5 kg.

The mean number of haddock per set is 2.3 in 2004 down from the 2003 value of 7.3. The mean set weight is 4.2 kg in 2004 down from 10.3 kg in 2003. These numbers are more in keeping with the 2002 survey results and most of the other years. Both the 2001 and 2003 surveys reported much higher catches than the other years.

Figure 29 presents six graphs illustrating the range of haddock catch values exhibited over the seven years. Figures 29a and 29b report the haddock weights and numbers for the five largest sets each year. As noted, 2001 and 2003 exhibited the largest sets. Excluding these years, the largest sets are generally between 100 and 200 kg and 40 and 140 haddock, with 1998 again being much lower than this. In 2004 the largest set was 82 haddock with a weight of 158 kg.

The number of survey sets and the number of sets with haddock caught are shown in Figure29c and here the pattern is pretty consistent in all years. Figure 29d presents the mean weight per fish for each survey, defined as the ratio of the total weights to total numbers. This value ranges between 1.4 and 3.5 kg and is generally on the order of 2 kg.

Abundance and Biomass Estimates

Tables 15a and 15b present the STRAP output of estimated abundance and biomass. The estimated total number of haddock for 3Ps ranges from 0.22 million in 1998 to 6 million in 2001. The 2004 estimate is 1.2 million. Biomass estimates in Table 15b illustrate a similar pattern of estimates to the abundance. The total 3Ps haddock biomass estimates range from 0.7 ktonnes in 1998 to 6.4 ktonnes in 2001. The 2004 estimate is 2.3 ktonnes. In most years the estimates are present in the 101 to 150 fathom and 51 to 100 fathom regimes. There are generally few haddock in the shallowest regime of less than 30 fathoms, except for 2001 when approximately 13% of the total abundance estimate and 28% of the total abundance estimate.

Figure 30 presents a 3d chart of the annual distribution of abundance estimates, where the percent of the total abundance in each stratum is shown. The predominance of haddock in strata 319 and 318 is clear. Small contributions are also seen in the shallower strata 314, 320, and 312 and in strata 310, 313, and 316 in the 101-150 fathom regime, prior to 2002. For the past three years the stock is almost exclusively found in strata 319 and 318.

Figures 31 and 32 present 3d histograms of the abundance and biomass estimates grouped by strata for all years. As presented in Tables 15a and 15b, the general patterns of strata with greatest numbers in strata 318 and 319 at the mouth of the Halibut Channel are clearly shown. The annual variation in the total estimates of abundance and biomass is also seen with no clear trend evident.

Figure 33 reports the mean number of fish per tow and mean weight per tow from the stratified analysis for each of the surveys. The mean number of haddock per tow ranges from 0.3 in 1998 and 1.2 in 1999 to 4.1 in 2003 and 6.9 in 2001. The 2004 value is 1.4. The mean weight per tow ranges from 0.8 kg in 1998 and 2.9 kg in 1999 to 5.8 kg in 2003 and 7.4 in 2001. The 2004 value is 2.6 kg.

Haddock Summary

The 2004 haddock catch numbers and weights were down from 2003 by a factor of two to three. The abundance estimate of 1.2 million haddock and biomass estimate of 2.3 ktonnes were the lowest estimates since 1999. The general pattern of haddock catches being predominantly of the slopes at the entrance to the Halibut Channel remains. There also continues to be a large inter-annual variability in the magnitudes of the abundance and biomass estimates.

Table 1 Summary of Cod Catches for Stratified Random Survey Sets, NAFO Subdivision 3Ps, 1 -14 Dec 2004.

M.V. Pennysmart Trip	Set	Year	Month	Day	StrLin	Division	Unit Area	Depth (m)	Set Location Lat (N)	Long (W)	COD Catch # of Fish	Catch Weight (kg)	Set Duration (min)	Tow Distance (n.mi.)	COD Mean Weight (kg)
9	1	4	12	1	322	3P	M29	155	46.61	55.14	1	0.8	30	1.6	0.8
9	2	4	12	1	322	3P	M29	127	46.55	55.38	6	10.5	30	1.6	1.8
9	3	4	12	1	322	3P	M30	153	46.36	55.64	3	3.5	29	1.5	1.2
9	4	4	12	2	322	3P	M30	147	46.33	55.66	0	0	30	1.5	
9	5	4	12	2	322	3P	L30	153	46.37	56.01	0	0	30	1.6	
9	6	4	12	2	322	3P	L30	114	46.30	56.10	0	0	30	1.5	
9	7	4	12	2	322	3P	L30	117	46.27	56.05	1	3	30	1.5	3.0
9	8	4	12	2	321	3P	M30	78	46.22	55.77	0	0	30	1.5	
9	9	4	12	2	321	3P	M30	62	46.07	55.69	0	0	30	1.5	
9	10	4	12	2	321	3P	M31	70	45.95	55.67	1	1.2	30	1.6	1.2
9	11	4	12	2	321	3P	M31	60	45.78	55.56	0	0	30	1.6	
9	12	4	12	2	321	3P	M31	71	45.79	55.47	6	24	30	1.6	4.0
9	13	4	12	2	323	3P	M31	141	45.97	55.35	0	0	30	1.5	
9	14	4	12	2	323	3P	M31	158	45.97	55.22	0	0	30	1.6	
9	15	4	12	3	323	3P	M30	127	46.08	55.33	5	11	30	1.5	2.2
9	16	4	12	3	323	3P	M30	120	46.14	55.26	3	5.5	30	1.5	1.8
9	17	4	12	3	322	3P	M30	160	46.28	55.16	0	0	30	1.5	
9	18	4	12	3	324	3P	N30	110	46.38	54.57	7	8	30	1.5	1.1
9	19	4	12	3	324	3P	N30	99	46.42	54.47	0	0	30	1.5	
9	20	4	12	3	324	3P	N30	115	46.23	54.72	1	3	30	1.5	3.0
9	21	4	12	4	325	3P	N31	74	45.93	54.77	0	0	30	1.6	
9	22	4	12	4	325	3P	N31	84	45.82	54.60	0	0	30	1.6	
9	23	4	12	4	326	3P	N31	79	45.82	54.43	0	0	30	1.5	
9	24	4	12	4	326	3P	N31	83	45.71	54.37	0	0	30	1.6	
9	25	4	12	4	325	3P	N31	78	45.77	54.70	0	0	30	1.5	
9	26	4	12	4	325	3P	N31	66	45.79	54.90	4	9	30	1.7	2.3
9	27	4	12	4	325	3P	N31	72	45.73	54.98	0	0	30	1.5	
9	28	4	12	4	321	3P	M31	70	45.60	55.47	3	15.6	25	1.2	5.2
9	29	4	12	4	315	3P	M31	68	45.55	55.48	2	6.5	30	1.6	3.3
9	30	4	12	4	315	3P	M32	71	45.47	55.51	8	41.5	30	1.6	5.2
9	31	4	12	4	320	3P	M31	43	45.60	55.93	8	95	30	1.6	11.9
9	32	4	12	5	320	3P	M31	48	45.69	55.97	3	27	30	1.5	9.0
9	33	4	12	5	320	3P	M31	51	45.81	55.93	3	5	30	1.6	1.7
9	34	4	12	5	321	3P	L31	53	45.93	56.03	1	15	30	1.5	15.0
9	36	4	12	5	320	3P	L32	48	45.47	56.06	3	18	30	1.5	6.0
9	37	4	12	5	315	3P	M32	75	45.30	55.77	1	14	30	1.5	14.0
9	38	4	12	5	319	3P	M32	137	45.32	55.11	11	18	30	1.5	1.6
9	39	4	12	5	319	3P	N32	109	45.29	54.98	2	5	30	1.5	2.5
9	40	4	12	5	325	3P	N32	86	45.34	54.71	1	2	30	1.5	2.0
9	41	4	12	5	319	3P	N32	90	45.27	54.70	0	0	30	1.6	
9	42	4	12	5	319	3P	N32	112	45.22	54.53	2	2	30	1.5	1.0
9	43	4	12	5	319	3P	N32	125	45.15	54.69	7	41	30	1.6	5.9
9	44	4	12	6	318	3P	N32	189	45.07	54.71	4	16	30	1.5	4.0
9	46	4	12	7	707	3P	M32	358	45.10	55.16	5	16	30	1.5	3.2
9	47	4	12	7	319	3P	M32	166	45.09	55.27	258	697.2	30	1.6	2.7
9	48	4	12	7	707	3P	M32	330	45.02	55.37	123	254	30	1.5	2.1
9	49	4	12	8	318	3P	M33	217	44.92	55.72	61	148	30	1.5	2.4
9	50	4	12	8	708	3P	M33	374	44.87	55.68	10	19	30	1.5	1.9
9	51	4	12	8	708	3P	M33	374	44.88	55.94	2	5	30	1.5	2.5
9	52	4	12	8	315	3P	L32	65	45.14	56.03	1	2	30	1.5	2.0
9	53	4	12	8	316	3P	L32	239	45.39	56.43	45	142	30	1.5	3.2
9	54	4	12	8	706	3P	L32	303	45.50	56.57	6	23	30	1.7	3.8
9	55	4	12	8	317	3P	L31	138	45.70	56.65	9	15	30	1.7	1.7
9	56	4	12	8	317	3P	L31	150	45.73	56.68	7	14	30	1.6	2.0
9	57	4	12	8	320	3P	L31	51	45.88	56.60	0	0	30	1.5	
9	58	4	12	9	320	3P	L31	51	45.92	56.64	1	0.2	30	1.4	0.2
9	59	4	12	9	315	3P	L31	61	45.87	56.76	73	557	30	1.4	7.6
9	60	4	12	9	316	3P	L31	229	45.87	56.86	17	48	30	1.5	2.8
9	61	4	12	9	706	3P	L31	352	45.80	56.92	0	0	30	1.5	
9	62	4	12	9	708	3P	K31	337	45.93	57.04	2	5	30	1.5	2.5
9	63	4	12	10	313	3P	K30	234	46.12	57.14	8	9	30	1.5	1.1
9	64	4	12	10	705	3P	K30	306	46.25	57.34	0	0	30	1.5	
9	65	4	12	10	311	3P	K30	127	46.30	57.24	0	0	30	1.5	
9	66	4	12	10	314	3P	L30	55	46.32	56.71	1	2	30	1.5	2.0
9	67	4	12	10	314	3P	L30	55	46.20	56.62	2	3	30	1.5	1.5
9	68	4	12	10	314	3P	L30	54	46.10	56.49	0	0	30	1.4	
9	69	4	12	10	314	3P	L30	52	46.12	56.69	0	0	24	1.2	
9	70	4	12	10	312	3P	L30	83	46.18	56.92	1	1	30	1.5	1.0
9	71	4	12	10	312	3P	K30	73	46.34	57.25	16	55	19	0.9	3.4
9	73	4	12	10	705	3P	K30	314	46.41	57.45	0	0	22	1.1	
9	74	4	12	10	313	3P	K30	232	46.45	57.42	12	27	30	1.5	2.3
9	75	4	12	11	311	3P	K29	145	46.85	57.09	4	15	30	1.5	3.8
9	76	4	12	11	310	3P	K29	220	46.90	57.13	27	58	30	1.5	2.1
9	77	4	12	11	310	3P	K29	252	46.92	57.19	46	112	30	1.5	2.4
9	78	4	12	11	713	3P	K29	417	46.56	57.69	0	0	30	1.5	
9	79	4	12	11	713	3P	K30	472	46.45	57.90	0	0	30	1.6	
9	80	4	12	11	713	3P	K30	475	46.23	57.92	0	0	30	1.5	
9	81	4	12	11	713	3P	K30	485	46.09	57.63	0	0	30	1.4	
9	82	4	12	11	712	3P	K31	456	45.78	57.39	0	0	30	1.5	
9	83	4	12	11	712	3P	K31	447	45.69	57.32	0	0	30	1.5	
9	84	4	12	12	712	3P	K32	435	45.39	57.05	0	0	30	1.5	
9	85	4	12	12	711	3P	L32	421	45.37	56.90	0	0	30	1.5	
9	86	4	12	12	711	3P	L32	397	45.05	56.50	0	0	30	1.6	
9	87	4	12	12	711	3P	L33	391	44.89	56.62	1	2	30	1.6	2.0
9	88	4	12	12	317	3P	L33	108	44.98	56.09	27	41	30	1.5	1.5
9	104	4	12	14	323	3P	M31	157	45.64	55.16	10	25	31	1.5	2.5
									Minimum		0.0	0.0	19.0	0.9	0.2
									Maximum		258.0	697.2	31.0	1.7	15.0
									Mean		10.1	31.4	29.7	1.5	3.3
									Median		1.0	3.0	30.0	1.5	2.4
									Standard Error		0.4	1.2	0.0	0.0	0.0
									Total		872.0	2696.5			

Note: Sets 89-103 were tagging sets and are excluded from the stratified random survey

Table 2a Stratified Analysis Estimated Cod Abundance and Biomass

COD GEAC 3PS 2004 No Zone
ANALYSIS FOR TRIP 9 2004 VESSEL 49 ICNAF 3P SPECIES 0438

NUMBERS

STRATUM	NO.SETS	TOTAL	AV./SET	UNITS	TOTAL NO	VAR.
310	2	73.00	36.50	9255.	337823.	180.50
311	2	4.00	2.00	17903.	35806.	8.00
312	2	27.67	13.83	16281.	225226.	329.39
313	2	20.00	10.00	11147.	111470.	8.00
314	4	3.00	0.75	61748.	46311.	0.92
315	5	89.59	17.92	52357.	938130.	1143.50
316	2	62.00	31.00	11147.	345558.	392.00
317	3	41.50	13.83	11620.	160757.	130.47
318	2	65.00	32.50	8715.	283236.	1624.50
319	6	263.44	43.91	66477.	2918749.	9421.81
320	6	17.38	2.90	79988.	231752.	6.59
321	7	11.31	1.62	73503.	118786.	4.88
322	8	10.56	1.32	94648.	124966.	4.08
323	5	18.00	3.60	47020.	169273.	17.30
324	3	8.00	2.67	33374.	88996.	14.33
325	6	4.53	0.75	63775.	48144.	2.01
326	2	0.00	0.00	11215.	0.	0.00
705	2	0.00	0.00	13174.	0.	0.00
706	3	7.29	2.43	28509.	69317.	7.15
707	2	128.00	64.00	4999.	319954.	6962.00
708	2	12.00	6.00	8512.	51074.	32.00
711	3	0.94	0.31	37630.	11759.	0.29
712	3	0.00	0.00	49385.	0.	0.00
713	4	0.00	0.00	57492.	0.	0.00

TOTAL	TOTAL UPPER	TOTAL LOWER	AVERAGE MEAN	AVERAGE UPPER	AVERAGE LOWER
6637086.	13484597.	-210426.	7.63	15.50	-0.24

EFFECTIVE DEGREES OF FREEDOM= 6 STUDENTS T-VALUE= 2.45 ALPHA=0.05

WEIGHTS

STRATUM	NO.SETS	TOTAL	AV./SET	UNITS	TOTAL NO	VAR.
310	2	170.00	85.00	9255.	786710.	1458.00
311	2	15.00	7.50	17903.	134271.	112.50
312	2	92.67	46.33	16281.	754373.	4110.22
313	2	36.00	18.00	11147.	200647.	162.00
314	4	5.00	1.25	61748.	77185.	2.25
315	5	657.79	131.56	52357.	6887974.	67841.91
316	2	190.00	95.00	11147.	1058968.	4418.00
317	3	67.36	22.45	11620.	260907.	257.98
318	2	164.00	82.00	8715.	714626.	8712.00
319	6	717.06	119.51	66477.	7944676.	68671.93
320	6	138.96	23.16	79988.	1852589.	1157.73
321	7	58.13	8.30	73503.	610336.	105.02
322	8	17.09	2.14	94648.	202237.	11.74
323	5	41.50	8.30	47020.	390268.	107.95
324	3	11.00	3.67	33374.	122370.	16.33
325	6	9.94	1.66	63775.	105666.	10.12
326	2	0.00	0.00	11215.	0.	0.00
705	2	0.00	0.00	13174.	0.	0.00
706	3	25.29	8.43	28509.	240373.	111.79
707	2	270.00	135.00	4999.	674902.	28322.00
708	2	24.00	12.00	8512.	102147.	98.00
711	3	1.88	0.63	37630.	23519.	1.17
712	3	0.00	0.00	49385.	0.	0.00
713	4	0.00	0.00	57492.	0.	0.00

TOTAL	TOTAL UPPER	TOTAL LOWER	AVERAGE MEAN	AVERAGE UPPER	AVERAGE LOWER
23144744.	44700652.	1588840.	26.61	51.39	1.83

EFFECTIVE DEGREES OF FREEDOM= 9 STUDENTS T-VALUE= 2.26 ALPHA=0.05

Table 2b Stratified Analysis Estimated Cod Abundance and Biomass: Comparison for 1997-2004

3Ps Cod Estimates						
"numbers"abundance (millions of fish)						
	95% upper limit	Estimated	95% lower limit	95% upper limit	Mean #fish /tow	95% lower limit
1997	57.1	30.9	4.8	97	52.6	8.2
1998 **	11.9	10.5	9.1	14	12.6	11
1999	20.7	13.7	6.7	24.9	16.5	8.1
2000 **	61.7	37.7	13.6	74.2	45.3	16.4
2001	79.6	44.0	8.3	91.5	50.5	9.58
2002	119.2	37.9	0	138.9	44.1	0
2003	51.9	21.9	0	59.7	25.1	0
2004	13.5	6.6	0	15.5	7.6	0
"weights" biomass (ktonnes)						
	95% upper limit	Estimated	95% lower limit	95% upper limit	Mean catch /tow (kg)	95% lower limit
1997	174.2	99.3	24.4	296	169	41
1998 **	56.8	47.9	38.9	68.3	57.5	46.8
1999	61.7	44.5	27.3	74.1	53.5	32.9
2000 **	324.5	187.2	50.0	389.9	225.0	60.0
2001	142.7	82.7	22.7	164.0	95.1	26.1
2002	291.0	92.2	0	338.9	107.4	0
2003	162.5	69.7	0	186.8	80.1	0
2004	44.7	23.1	0	51.4	26.6	0

** 75% upper and lower limits reported for 1998, 2000, 2003
*** Note: variance too large for valid lower limits for 2002-2004. Negative limit computed: 0 reported.

Table 3a Stratified Analysis Cod Age Composition, Numbers per Standard Tow

COD GEAC 2004 3PS No Zone (S1 BY AGE)
ANALYSIS FOR TRIP 9 2004 VESSEL 49 ICNAF 3P

AGE COMPOSITION-NUMBERS PER STANDARD TOW
SUMMARY TABLE SPECIES:SPECIES 0438 SEX:COMBINED

AGE IN YEARS	TOTAL NUMBERS	UPPER LIMIT	LOWER LIMIT	MEAN PER TOW	UPPER LIMIT	LOWER LIMIT	D.F.
0.0	0.	0.	0.	0.00	0.00	0.00	0
0.0	0.	0.	0.	0.00	0.00	0.00	0
1.0	0.	0.	0.	0.00	0.00	0.00	0
2.0	72280.	125312.	19248.	0.08	0.14	0.02	14
3.0	587728.	872013.	303444.	0.68	1.00	0.35	10
4.0	698068.	1262001.	134135.	0.80	1.45	0.15	6
5.0	931703.	2139497.	-276092.	1.07	2.46	-0.32	5
6.0	2596044.	6126000.	-933911.	2.98	7.04	-1.07	5
7.0	1024389.	2121759.	-72981.	1.18	2.44	-0.08	7
8.0	129942.	277767.	-17882.	0.15	0.32	-0.02	7
9.0	108066.	216166.	-33.	0.12	0.25	0.00	8
10.0	157555.	367095.	-51986.	0.18	0.42	-0.06	5
11.0	109831.	290236.	-70575.	0.13	0.33	-0.08	4
12.0	43936.	133994.	-46122.	0.05	0.15	-0.05	4
13.0	0.	0.	0.	0.00	0.00	0.00	0
14.0	110515.	306988.	-85957.	0.13	0.35	-0.10	4
15.0	55834.	145199.	-33530.	0.06	0.17	-0.04	4
16.0	11195.	29152.	-6762.	0.01	0.03	-0.01	5
UNKNOWN	0.	0.	0.	0.00	0.00	0.00	0
TOTAL	6637086.	13484597.	-210425.	7.63	15.50	-0.24	6

ESTIMATION TYPE:STANDARD TRANSFORMATION TYPE:NONE CONFIDENCE LEVEL: 0.95%
****-ONE OR MORE OF THE LOWER LIMITS IN THE ABOVE TABLE IS LESS THAN OR EQUAL TO ZERO.
VARIANCE IS TOO LARGE FOR VALID CONFIDENCE LIMITS ****

Table 3b Stratified Analysis Estimated Cod Abundance Age Distribution: 1997-2004

	3Ps Cod Estimates															
	"number" abundance (millions of fish)								Mean #fish/tow							
Age (years)	1997	1998	1999	2000	2001	2002	2003	2004	1997	1998	1999	2000	2001	2002	2003	2004
1		0.01			0.03					0.01			0.03			
2	0.17	0.05	0.28	1.36	0.18		0.19	0.07	0.29	0.06	0.34	1.64	0.21		0.22	0.08
3	1.93	0.33	0.95	6.03	10.85	1.08	0.36	0.59	3.28	0.40	1.14	7.24	12.47	1.26	0.41	0.68
4	5.55	1.47	1.43	2.38	23.26	14.49	2.10	0.70	9.42	1.76	1.71	2.86	26.74	16.88	2.46	0.80
5	8.02	1.93	2.35	2.79	3.27	15.86	7.30	0.93	13.62	2.32	2.83	3.35	3.75	18.47	8.34	1.07
6	1.78	1.51	2.98	4.31	1.86	2.48	8.07	2.60	3.02	1.81	3.58	5.18	2.14	2.90	9.28	2.98
7	5.91	0.29	2.73	4.90	1.41	1.19	1.15	1.02	10.03	0.35	3.27	5.89	1.62	1.39	1.32	1.18
8	7.05	1.36	0.43	3.32	1.17	1.01	0.60	0.13	11.97	1.64	0.51	3.99	1.34	1.18	0.73	0.15
9	0.79	2.83	1.19	0.95	0.84	0.78	1.15	0.11	1.34	3.40	1.43	1.14	0.96	0.91	1.32	0.12
10	0.32	0.33	1.13	4.85	0.09	0.39	0.42	0.16	0.54	0.40	1.36	5.83	0.10	0.46	0.48	0.18
11	0.14	0.04	0.14	5.94	0.38	0.07	0.21	0.11	0.24	0.04	0.17	7.14	0.44	0.09	0.24	0.13
12	0.02	0.11	0.08	0.66	0.50	0.23	0.00	0.04	0.04	0.13	0.10	0.79	0.58	0.27	0.00	0.05
13		0.18	0.01	0.09	0.07	0.26	0.14	0.00		0.22	0.02	0.11	0.08	0.30	0.16	0.00
14		0.00		0.14	0.04		0.13	0.11		0.00		0.17	0.05		0.15	0.13
15		0.03			0.03		0.03	0.06		0.04			0.03		0.03	0.06
16					0.01			0.01					0.02			0.01

Table 4a Cod abundance estimates (thousands of fish) from GEAC surveys in NAFO Subdivision 3Ps from 1997-2004

Depth range (fathoms)	Strata	Vessel Trip #Sets Mean Date sq. mi.	Pennysmart 2 84 12-Dec 1997	Pennysmart 3 86 06-Dec 1998	Pennysmart 4 90 27-Nov 1999	Pennysmart 5 73 10-Dec 2000	Pennysmart 6 91 05-Dec 2001	Pennysmart 7 75 29-Nov 2002	Pennysmart 8 89 04-Dec 2003	Pennysmart 9 86 06-Dec 2004
<30	314	974	86	1111	138	5527	15972	152	2787	46
	320	1320	4004	1540	1914	2760	22386	745	1823	232
		Subtotal	4090	2651	2052	8287	38358	897	4610	278
31-50	312	272	725	33	347	554	8	73	627	225
	315	827	2046	1456	3158	3304	446	342	135	938
	321	1189	175	189	250	73	127	1481	103	119
	325	944	50	11	52	16	104	64	31	48
	326	166	17	0	5	5	16	.	0	0
		Subtotal	3013	1689	3812	3952	701	1960	896	1330
51-100	311	317	832	63	141	18	197	303	25	36
	317	193	226	331	126	494	30	23	861	161
	319	984	17410	370	833	10991	4135	33092	252	2919
	322	1567	.	95	253	110	105	185	92	125
	323	696	225	47	18	0	176	93	80	169
	324	494	.	78	100	125	11	81	33	89
		Subtotal	18693	984	1471	11738	4654	33777	1343	3499
101-150	310	170	150	699	134	449	88	97	555	339
	313	165	443	167	1053	240	84	83	21	111
	316	189	3606	312	92	117	39	5	43	346
	318	129	339	3736	4959	12545	37	943	14142	283
		Subtotal	4538	4914	6238	13351	248	1128	14761	1079
151-200	705	195	103	7	0	0	0	0	0	0
	706	476	513	29	10	19	0	54	20	69
	707	74	29	180	137	345	0	5	210	320
		Subtotal	645	216	147	364	0	59	230	389
201-300	708	126	.	9	17	25	0	4	17	51
	711	593	.	.	.	.	0	18	13	12
	712	731	.	0	0	0	0	0	0	0
	713	851	.	19	0	0	0	13	0	0
		Subtotal	0	28	17	25	0	35	30	63
	Total [1]		30,979	10,482	13,737	37,717	43,961	37,856	21,870	6,638

[1] Totals are for all strata fished. Individual strata totals rounded to nearest 1000.
. denotes strata not fished

Table 4b Cod biomass estimates (t) from GEAC surveys in NAFO Subdivision 3Ps from 1997-2004

Depth range (fathoms)	Strata	Vessel / Trip / #Sets / Mean Date / sq. mi.	Pennysmart 2 12-Dec 1997	Pennysmart 3 06-Dec 1998	Pennysmart 4 27-Nov 1999	Pennysmart 5 10-Dec 2000	Pennysmart 6 05-Dec 2001	Pennysmart 7 29-Nov 2002	Pennysmart 8 04-Dec 2003	Pennysmart 9 06-Dec 2004
<30	314	974	262	7464	246	62730	25024	540	12597	77
	320	1320	18907	5287	5276	4813	48280	2250	7095	1853
		Subtotal	19169	12751	5522	67543	73304	2790	19692	1930
31-50	312	272	1215	138	775	1123	7	161	1862	754
	315	827	11171	4071	10443	22405	1019	914	950	6888
	321	1189	301	559	962	87	151	4246	151	610
	325	944	89	55	113	8	327	56	108	106
	326	166	36	0	2	8	7	.	0	0
		Subtotal	12812	4823	12295	23631	1511	5377	3071	8358
51-100	311	317	1558	120	286	27	292	589	46	134
	317	193	957	938	336	598	164	76	2601	261
	319	984	48133	1255	2455	22369	6498	80311	572	7945
	322	1567	.	149	345	137	174	303	185	202
	323	696	341	103	31	0	258	140	171	390
	324	494	.	174	78	66	13	104	65	122
		Subtotal	50989	2739	3531	23197	7399	81523	3640	9054
101-150	310	170	263	1823	322	1039	170	171	1393	787
	313	165	1132	458	2469	563	131	169	55	201
	316	189	12362	803	292	312	104	8	111	1059
	318	129	911	23797	19561	69788	65	2028	41165	715
		Subtotal	14668	26881	22644	71702	470	2376	42724	2762
151-200	705	195	277	11	0	0	0	0	0	0
	706	476	1317	118	33	43	0	93	69	240
	707	74	96	480	466	1019	0	27	415	675
		Subtotal	1690	609	499	1062	0	120	484	915
201-300	708	126	.	16	29	94	0	9	25	102
	711	593	.	.	.	.	0	5	25	24
	712	731	.	0	0	0		0	0	0
	713	851	.	57	0	0	0	7	0	0
		Subtotal	0	73	29	94	0	21	50	126
	Total [1]		99,328	47,876	44,520	187,229	82,684	92,207	69,661	23,145

[1] Totals are for all strata fished. Individual strata totals rounded to nearest 1000.
. denotes strata not fished

Table 5 Summary of Plaice Catches for Stratified Random Survey Sets, NAFO Subdivision 3Ps, 1-14 Dec 2004.

M.V. Pennysmart											PLAICE		Set	Tow	PLAICE
Trip	Set	Year	Month	Day	StrLin	Division	Unit Area	Depth (m)	Set Location Lat (N)	Long (W)	Catch # of Fish	Catch Weight (kg)	Duration (min)	Distance (n.mi.)	Mean Weight (kg)
9	1	4	12	1	322	3P	M29	155	46.61	55.14	1	0.1	30	1.6	0.1
9	2	4	12	1	322	3P	M29	127	46.55	55.38	1	0.1	30	1.6	0.1
9	3	4	12	1	322	3P	M30	153	46.36	55.64	0	0	29	1.5	
9	4	4	12	2	322	3P	M30	147	46.33	55.66	8	5	30	1.5	0.6
9	5	4	12	2	322	3P	L30	153	46.37	56.01	35	16	30	1.6	0.5
9	6	4	12	2	322	3P	L30	114	46.30	56.10	5	3	30	1.5	0.6
9	7	4	12	2	322	3P	L30	117	46.27	56.05	12	5	30	1.5	0.4
9	8	4	12	2	321	3P	M30	78	46.22	55.77	4	3	30	1.5	0.8
9	9	4	12	2	321	3P	M30	62	46.07	55.69	6	5.5	30	1.5	0.9
9	10	4	12	2	321	3P	M31	70	45.95	55.67	1	1.5	30	1.6	1.5
9	11	4	12	2	321	3P	M31	60	45.78	55.56	0	0	30	1.6	
9	12	4	12	2	321	3P	M31	71	45.79	55.47	17	10	30	1.6	0.6
9	13	4	12	2	323	3P	M31	141	45.97	55.35	5	2	30	1.5	0.4
9	14	4	12	2	323	3P	M31	156	45.97	55.22	7	3	30	1.6	0.4
9	15	4	12	3	323	3P	M30	127	46.08	55.33	2	0.9	30	1.5	0.5
9	16	4	12	3	323	3P	M30	120	46.14	55.26	0	0	30	1.5	
9	17	4	12	3	322	3P	M30	180	46.26	55.16	6	1.5	30	1.5	0.3
9	18	4	12	3	324	3P	N30	110	46.38	54.57	2	1	30	1.5	0.5
9	19	4	12	3	324	3P	N30	99	46.42	54.47	1	1	30	1.5	1.0
9	20	4	12	3	324	3P	N30	115	46.23	54.72	8	4	30	1.5	0.5
9	21	4	12	4	325	3P	N31	74	45.93	54.77	4	3	30	1.6	0.8
9	22	4	12	4	325	3P	N31	84	45.82	54.60	1	0.5	30	1.6	0.5
9	23	4	12	4	326	3P	N31	79	45.82	54.43	0	0	30	1.5	
9	24	4	12	4	326	3P	N31	83	45.71	54.37	0	0	30	1.6	
9	25	4	12	4	325	3P	N31	78	45.77	54.70	1	1.5	30	1.5	1.5
9	26	4	12	4	325	3P	N31	66	45.79	54.90	0	0	30	1.7	
9	27	4	12	4	325	3P	N31	72	45.73	54.98	0	0	30	1.5	
9	28	4	12	4	321	3P	M31	70	45.60	55.47	6	4	25	1.2	0.7
9	29	4	12	4	315	3P	M31	68	45.55	55.48	19	17	30	1.6	0.9
9	30	4	12	4	315	3P	M32	71	45.47	55.51	48	51	30	1.6	1.1
9	31	4	12	4	320	3P	M31	43	45.60	55.93	7	7	30	1.6	1.0
9	32	4	12	5	320	3P	M31	48	45.69	55.97	11	14	30	1.5	1.3
9	33	4	12	5	320	3P	M31	51	45.81	55.93	13	19	30	1.6	1.5
9	34	4	12	5	321	3P	L31	53	45.93	56.03	1	1	30	1.5	1.0
9	36	4	12	5	320	3P	L32	48	45.47	56.06	37	39	30	1.5	1.1
9	37	4	12	5	315	3P	M32	75	45.30	55.77	323	223	30	1.5	0.7
9	38	4	12	5	319	3P	M32	137	45.32	55.11	50	24	30	1.5	0.5
9	39	4	12	5	319	3P	N32	109	45.29	54.98	80	42	30	1.5	0.5
9	40	4	12	5	325	3P	N32	86	45.34	54.71	4	2.5	30	1.5	0.6
9	41	4	12	5	319	3P	N32	90	45.27	54.70	3	2	30	1.6	0.7
9	42	4	12	5	319	3P	N32	112	45.22	54.53	11	5	30	1.5	0.5
9	43	4	12	5	319	3P	N32	125	45.15	54.69	200	109	30	1.6	0.5
9	44	4	12	6	318	3P	N32	189	45.07	54.71	14	12	30	1.5	0.9
9	46	4	12	7	707	3P	M32	358	45.10	55.16	0	0	30	1.5	
9	47	4	12	7	319	3P	M32	166	45.09	55.27	3	2	30	1.6	0.7
9	48	4	12	7	707	3P	M32	330	45.02	55.37	1	0.3	30	1.5	0.3
9	49	4	12	8	318	3P	M33	217	44.92	55.72	5	2	30	1.5	0.4
9	50	4	12	8	708	3P	M33	374	44.87	55.68	0	0	30	1.5	
9	51	4	12	8	708	3P	M33	374	44.88	55.94	1	3	30	1.5	3.0
9	52	4	12	8	315	3P	L32	95	45.14	56.03	22	22	30	1.5	1.0
9	53	4	12	8	316	3P	L32	239	45.39	56.43	3	2.5	30	1.5	0.8
9	54	4	12	8	706	3P	L32	303	45.50	56.57	19	21	30	1.7	1.1
9	55	4	12	8	317	3P	L31	138	45.70	56.65	955	907.88	30	1.7	1.0
9	56	4	12	8	317	3P	L31	150	45.73	56.68	772	704	30	1.6	0.9
9	57	4	12	8	320	3P	L31	51	45.88	56.60	160	173	30	1.5	1.1
9	58	4	12	9	320	3P	L31	51	45.92	56.64	43	39	30	1.4	0.9
9	59	4	12	9	315	3P	L31	61	45.87	56.76	18	22	30	1.4	1.2
9	60	4	12	9	316	3P	L31	229	45.87	56.86	3	5	30	1.5	1.7
9	61	4	12	9	706	3P	L31	352	45.80	56.92	7	9	30	1.5	1.3
9	62	4	12	9	706	3P	K31	337	45.93	57.04	5	3	30	1.5	0.6
9	63	4	12	10	313	3P	K30	234	46.12	57.14	4	2	30	1.5	0.5
9	64	4	12	10	705	3P	K30	306	46.25	57.34	11	15	30	1.5	1.4
9	65	4	12	10	311	3P	K30	127	46.30	57.24	128	115	30	1.5	0.9
9	66	4	12	10	314	3P	L30	55	46.32	56.71	19	13	30	1.5	0.7
9	67	4	12	10	314	3P	L30	55	46.20	56.62	7	7	30	1.5	1.0
9	68	4	12	10	314	3P	L30	54	46.10	56.49	0	0	30	1.4	
9	69	4	12	10	314	3P	L30	52	46.12	56.69	1	0.7	24	1.2	0.7
9	70	4	12	10	312	3P	L30	83	46.18	56.92	51	27	30	1.5	0.5
9	71	4	12	10	312	3P	K30	73	46.34	57.25	5	5	19	0.9	1.0
9	73	4	12	10	705	3P	K30	314	46.41	57.45	9	6.5	22	1.1	0.8
9	74	4	12	10	313	3P	K30	232	46.45	57.42	10	10	30	1.5	1.0
9	75	4	12	11	311	3P	K29	145	46.85	57.09	59	35	30	1.5	0.6
9	76	4	12	11	310	3P	K29	220	46.90	57.13	12	6	30	1.5	0.5
9	77	4	12	11	310	3P	K29	252	46.92	57.19	8	7	30	1.5	0.9
9	78	4	12	11	713	3P	K29	417	46.58	57.69	3	2	30	1.5	0.7
9	79	4	12	11	713	3P	K30	472	46.45	57.90	2	1.5	30	1.6	0.8
9	80	4	12	11	713	3P	K30	475	46.23	57.92	1	0.4	30	1.5	0.4
9	81	4	12	11	713	3P	K30	485	46.09	57.63	0	0	30	1.4	
9	82	4	12	11	712	3P	K31	456	45.78	57.39	0	0	30	1.5	
9	83	4	12	11	712	3P	K31	447	45.69	57.32	0	0	30	1.5	
9	84	4	12	12	712	3P	K32	435	45.39	57.05	0	0	30	1.5	
9	85	4	12	12	711	3P	L32	421	45.37	56.90	0	0	30	1.5	
9	86	4	12	12	711	3P	L32	397	45.05	56.50	5	4	30	1.6	0.8
9	87	4	12	12	711	3P	L33	391	44.89	56.62	0	0	30	1.6	
9	88	4	12	12	317	3P	L33	108	44.98	56.09	61	52	30	1.5	0.9
9	104	4	12	14	323	3P	M31	157	45.64	55.16	10	6	31	1.5	0.6
									Minimum		0.0	0.0	19.0	0.9	0.10
									Maximum		955.0	907.9	31.0	1.7	3.00
									Mean		39.3	33.4	29.7	1.5	0.80
									Median		5.0	3.0	30.0	1.5	0.73
									Standard Error		1.6	1.5	0.0	0.0	0.00
									Total		3376.0	2869.9			

Note: Sets 89-103 were tagging sets and are excluded from the stratified random survey

Table 6a Stratified Analysis Estimated Plaice Abundance and Biomass

PLAICE GEAC 3PS 2004 No Zone
ANALYSIS FOR TRIP 9 2004 VESSEL 49 ICNAF 3P SPECIES 0889

NUMBERS

STRATUM	NO.SETS	TOTAL	AV./SET	UNITS	TOTAL NO	VAR.
310	2	20.00	10.00	9255.	92554.	8.00
311	2	187.00	93.50	17903.	1673913.	2380.50
312	2	59.33	29.67	16281.	483016.	910.22
313	2	14.00	7.00	11147.	78029.	18.00
314	4	27.25	6.81	61748.	420657.	75.31
315	5	427.10	85.42	52357.	4472340.	17761.16
316	2	6.00	3.00	11147.	33441.	0.00
317	3	1627.40	542.47	11620.	6303418.	177391.03
318	2	19.00	9.50	8715.	82792.	40.50
319	6	334.13	55.69	66477.	3701930.	5117.30
320	6	272.82	45.47	79988.	3637092.	3399.78
321	7	35.38	5.05	73503.	371452.	30.89
322	8	65.69	8.21	94648.	777153.	115.44
323	5	23.56	4.71	47020.	221583.	15.26
324	3	11.00	3.67	33374.	122370.	14.33
325	6	9.69	1.61	63775.	102969.	3.26
326	2	0.00	0.00	11215.	0.	0.00
705	2	21.91	10.95	13174.	144313.	0.00
706	3	28.76	9.59	28509.	273355.	39.63
707	2	1.00	0.50	4999.	2500.	0.50
708	2	1.00	0.50	8512.	4256.	0.50
711	3	4.69	1.56	37630.	58796.	7.32
712	3	0.00	0.00	49385.	0.	0.00
713	4	5.88	1.47	57492.	84441.	1.63

	TOTAL			AVERAGE	
TOTAL	UPPER	LOWER	MEAN	UPPER	LOWER
23142368.	34475956.	11808782.	26.60	39.63	13.58

EFFECTIVE DEGREES OF FREEDOM= 10 STUDENTS T-VALUE= 2.23 ALPHA=0.05

WEIGHTS

STRATUM	NO.SETS	TOTAL	AV./SET	UNITS	TOTAL NO	VAR.
310	2	13.00	6.50	9255.	60160.	0.50
311	2	150.00	75.00	17903.	1342711.	3200.00
312	2	35.33	17.67	16281.	287638.	174.22
313	2	12.00	6.00	11147.	66882.	32.00
314	4	20.88	5.22	61748.	322246.	36.61
315	5	332.32	66.46	52357.	3479889.	7805.29
316	2	7.50	3.75	11147.	41801.	3.13
317	3	1513.07	504.36	11620.	5860596.	158445.28
318	2	14.00	7.00	8715.	61005.	50.00
319	6	176.94	29.49	66477.	1960375.	1519.30
320	6	292.16	48.69	79988.	3894912.	3905.22
321	7	25.28	3.61	73503.	265463.	10.64
322	8	29.69	3.71	94648.	351234.	25.16
323	5	11.71	2.34	47020.	110145.	5.32
324	3	6.00	2.00	33374.	66747.	3.00
325	6	7.28	1.21	63775.	77393.	1.56
326	2	0.00	0.00	11215.	0.	0.00
705	2	23.86	11.93	13174.	157187.	18.83
706	3	30.53	10.18	28509.	290125.	61.33
707	2	0.30	0.15	4999.	750.	0.05
708	2	3.00	1.50	8512.	12768.	4.50
711	3	3.75	1.25	37630.	47037.	4.69
712	3	0.00	0.00	49385.	0.	0.00
713	4	3.81	0.95	57492.	54707.	0.84

	TOTAL			AVERAGE	
TOTAL	UPPER	LOWER	MEAN	UPPER	LOWER
18811770.	28411162.	9212379.	21.63	32.66	10.59

EFFECTIVE DEGREES OF FREEDOM= 8 STUDENTS T-VALUE= 2.31 ALPHA=0.05

Table 6b Stratified Analysis Estimated Plaice Abundance and Biomass: Comparison for 1998-2004

3Ps Plaice Estimates						
"numbers"abundance (millions of fish)						
	95% upper limit	Estimated	95% lower limit	95% upper limit	Mean #fish /tow	95% lower limit
1998	17.4	12.7	8.0	20.9	15.3	9.6
1999	85.4	44.1	2.7	102.6	52.9	3.3
2000	84.1	47.6	11.2	101.0	57.3	13.5
2001	113.8	59.3	4.8	130.8	68.2	5.5
2002	141.3	26.0	0	164.5	30.3	0
2003	42.4	25.6	8.8	48.8	29.5	10.1
2004	34.5	23.1	11.8	39.6	26.6	13.6
"weights" biomass (ktonnes)						
	95% upper limit	Estimated	95% lower limit	95% upper limit	Mean catch /tow (kg)	95% lower limit
1998	13.9	9.2	4.5	16.7	11.1	5.4
1999	57.8	28.7	0	69.4	34.5	0
2000	53.6	32.7	11.9	64.4	39.3	14.3
2001	69.7	36.4	3.1	80.2	41.9	3.6
2002	92.1	18.6	0	107.2	21.7	0
2003	42.1	25.2	8.3	48.4	28.9	9.52
2004	28.4	18.8	9.2	32.7	21.6	10.6
Note: variance too large for valid lower limits for 1999, 2002 biomass. Negative limit computed. Value of 0 reported.						

Table 7a Stratified Analysis Plaice Age Composition, Numbers per Standard Tow

PLAICE GEAC 2004 3PS No Zone (S1 BY AGE)
ANALYSIS FOR TRIP 9 2004 VESSEL 49 ICNAF 3P

AGE COMPOSITION-NUMBERS PER STANDARD TOW
SUMMARY TABLE SPECIES:SPECIES 0889 SEX:COMBINED

AGE IN YEARS	TOTAL NUMBERS	UPPER LIMIT	LOWER LIMIT	MEAN PER TOW	UPPER LIMIT	LOWER LIMIT	D.F.
0 to 2	0.	0.	0.	0.00	0.00	0.00	0
3.0	20338.	36191.	4486.	0.02	0.04	0.01	7
4.0	10359.	21846.	-1128.	0.01	0.03	0.00	11
5.0	376151.	553797.	198505.	0.43	0.64	0.23	8
6.0	2048240.	3100866.	995615.	2.35	3.56	1.14	9
7.0	3223100.	4840616.	1605584.	3.71	5.56	1.85	11
8.0	2624912.	3959256.	1290569.	3.02	4.55	1.48	11
9.0	2516901.	3843071.	1190732.	2.89	4.42	1.37	10
10.0	3966086.	6129702.	1802470.	4.56	7.05	2.07	9
11.0	2807450.	4263622.	1351279.	3.23	4.90	1.55	11
12.0	2182167.	3259485.	1104849.	2.51	3.75	1.27	11
13.0	1368616.	2143424.	593807.	1.57	2.46	0.68	7
14.0	842968.	1440864.	245072.	0.97	1.66	0.28	4
15.0	644255.	1231174.	57336.	0.74	1.42	0.07	3
16.0	363660.	721554.	5766.	0.42	0.83	0.01	3
17.0	89194.	170939.	7448.	0.10	0.20	0.01	4
18.0	46215.	128945.	-36515.	0.05	0.15	-0.04	2
19.0	12441.	34021.	-9138.	0.01	0.04	-0.01	6
UNKNOWN	0.	0.	0.	0.00	0.00	0.00	0
TOTAL	23143054.	34477164.	11808944.	26.61	39.63	13.58	10

ESTIMATION TYPE:STANDARD TRANSFORMATION TYPE:NONE
CONFIDENCE LEVEL: 0.95%
****-ONE OR MORE OF THE LOWER LIMITS IN THE ABOVE TABLE IS LESS THAN OR EQUAL TO ZERO.
VARIANCE IS TOO LARGE FOR VALID CONFIDENCE LIMITS ****

Table 7b Stratified Analysis Estimated Plaice Abundance Age Distribution: 1998-2004

	3Ps Plaice Estimates													
	"number" abundance (millions of fish)							Mean #fish/tow						
Age (years)	1998	1999	2000	2001	2002	2003	2004	1998	1999	2000	2001	2002	2003	2004
3		0.01	0.01	0.08	0.02		0.02		0.01	0.02	0.09	0.02		0.02
4	0.03		0.01	0.03	0.39	0.18	0.01	0.03		0.02	0.03	0.45	0.21	0.01
5	0.10	0.23	0.09	0.29	0.56	0.78	0.38	0.12	0.27	0.11	0.33	0.66	0.89	0.43
6	0.26	1.23	1.34	1.04	0.86	1.37	2.05	0.31	1.48	1.61	1.19	1.01	1.57	2.35
7	0.60	3.09	5.42	9.48	2.04	1.61	3.22	0.72	3.72	6.52	10.90	2.37	1.85	3.71
8	1.62	7.67	9.48	14.66	5.33	2.90	2.62	1.94	9.21	11.39	16.86	6.21	3.34	3.02
9	2.11	14.52	11.85	13.69	5.27	4.90	2.52	2.53	17.45	14.24	15.74	6.14	5.63	2.89
10	2.77	9.96	7.34	8.68	4.83	3.90	3.97	3.33	11.97	8.82	9.97	5.62	4.49	4.56
11	1.64	3.68	3.19	6.26	2.06	2.35	2.81	1.97	4.43	3.83	7.20	2.40	2.70	3.23
12	1.73	2.20	2.71	3.08	1.66	2.07	2.18	2.08	2.64	3.26	3.54	1.93	2.38	2.51
13	0.91	0.89	1.39	1.05	1.42	1.98	1.37	1.09	1.07	1.67	1.21	1.65	2.28	1.57
14	0.40	0.43	0.49	0.47	0.74	1.67	0.84	0.49	0.52	0.59	0.55	0.87	1.92	0.97
15	0.31	0.07	0.37	0.26	0.49	1.19	0.64	0.37	0.08	0.45	0.30	0.57	1.37	0.74
16	0.12	0.03	0.05	0.08	0.24	0.57	0.36	0.15	0.04	0.06	0.09	0.28	0.66	0.42
17	0.02	0.03	0.07	0.08	0.08	0.14	0.09	0.03	0.04	0.08	0.09	0.10	0.17	0.10
18	0.08		0.04	0.01	0.03	0.02	0.05	0.10		0.05	0.01	0.03	0.02	0.05
19							0.01							0.01

Table 8a Plaice abundance estimates (thousands of fish)
from GEAC surveys in NAFO Subdivision 3Ps from 1998-2004

Depth range (fathoms)	Strata	Vessel Trip #Sets Mean Date sq. mi	Pennysmart 3 86 06-Dec 1998	Pennysmart 4 90 27-Nov 1999	Pennysmart 5 73 10-Dec 2000	Pennysmart 6 91 05-Dec 2001	Pennysmart 7 75 29-Nov 2002	Pennysmart 8 89 04-Dec 2003	Pennysmart 9 86 06-Dec 2004
<30	314	974	198	190	3816	154	707	2644	421
	320	1320	3020	1147	800	930	687	4593	3637
		Subtotal	3218	1337	4616	1084	1394	7237	4058
31-50	312	272	147	779	33	269	0	154	483
	315	827	2838	5015	9945	15154	4918	6904	4472
	321	1189	210	2034	206	209	567	659	371
	325	944	53	144	16	83	188	10	103
	326	166	0	37	0	5	-	6	0
		Subtotal	3248	8009	10200	15720	5673	7733	5429
51-100	311	317	63	2202	528	6338	9116	2089	1674
	317	193	1482	1349	1278	862	1807	2336	6303
	319	984	1947	28370	29471	32748	5477	5016	3702
	322	1567	414	740	363	294	406	169	777
	323	696	263	906	436	881	835	219	222
	324	494	11	67	141	200	47	110	122
		Subtotal	4180	33634	32217	41323	17688	9939	12800
101-150	310	170	440	148	143	9	9	42	93
	313	165	418	72	100	184	314	26	78
	316	189	50	153	100	256	21	102	33
	318	129	84	17	0	289	173	122	83
		Subtotal	992	390	343	738	517	292	287
151-200	705	195	224	198	71	86	216	125	144
	706	476	475	295	151	152	332	125	273
	707	74	117	19	5	55	12	35	3
		Subtotal	816	512	227	293	560	285	420
201-300	708	126	21	4	16	89	26	63	4
	711	593	-	-	-	19	56	12	59
	712	731	16	85	0	12	66	23	0
	713	851	211	89	23	11	42	54	84
		Subtotal	248	178	39	131	190	152	147
	Total [1]		12,702	44,060	47,642	59,289	26,022	25,638	23,141

[1] Totals are for all strata fished. Individual strata totals rounded to nearest 1000.

Table 8b Plaice biomass estimates (t)
from GEAC surveys in NAFO Subdivision 3Ps from 1998-2004

Depth range (fathoms)	Strata	Vessel Trip #Sets Mean Date sq. mi.	Pennysmart 3 86 06-Dec 1998	Pennysmart 4 90 27-Nov 1999	Pennysmart 5 73 10-Dec 2000	Pennysmart 6 91 05-Dec 2001	Pennysmart 7 75 29-Nov 2002	Pennysmart 8 89 04-Dec 2003	Pennysmart 9 86 06-Dec 2004
<30	314	974	116	238	4025	188	795	2911	322
	320	1320	3030	997	820	1347	885	7475	3895
		Subtotal	3146	1235	4845	1535	1680	10386	4217
31-50	312	272	163	603	41	211	0	125	288
	315	827	1671	3652	8784	8273	3866	6352	3480
	321	1189	176	1198	132	172	679	692	265
	325	944	41	84	6	43	105	3	77
	326	166	0	14	0	2	-	3	0
		Subtotal	2051	5551	8963	8701	4650	7175	4110
51-100	311	317	43	1016	349	3676	5653	1601	1343
	317	193	1076	824	1084	594	1545	2172	5861
	319	984	940	18769	16567	20391	3255	2934	1960
	322	1567	131	202	118	107	175	78	351
	323	696	67	268	166	385	370	145	110
	324	494	11	27	26	65	23	16	67
		Subtotal	2268	21106	18310	25218	11021	6946	9692
101-150	310	170	273	99	72	5	16	31	60
	313	165	344	39	56	114	225	20	67
	316	189	32	139	100	291	29	145	42
	318	129	78	13	0	178	114	65	61
		Subtotal	727	290	228	588	384	261	230
151-200	705	195	144	138	109	66	195	124	157
	706	476	635	238	237	196	436	132	290
	707	74	60	11	2	36	12	16	1
		Subtotal	839	387	348	298	643	272	448
201-300	708	126	9	2	13	66	29	27	13
	711	593	-	-	-	13	75	12	47
	712	731	3	44	0	4	66	29	0
	713	851	161	65	34	5	56	61	55
		Subtotal	173	111	47	88	226	129	115
	Total	[1]	9,204	28,680	32,741	36,428	18,604	25,169	18,812

[1] Totals are for all strata fished. Individual strata totals rounded to nearest 1000.

Table 9 Summary of Witch Catches for Stratified Random Survey Sets, NAFO Subdivision 3Ps, 1-14 Dec 2004.

M.V. Pennysmart Trip	Set	Year	Month	Day	StrLn	Division	Unit Area	Depth (m)	Set Location Lat (N)	Long (W)	WITCH Catch # of Fish	Catch Weight (kg)	Set Duration (min)	Tow Distance (n.mi.)	WITCH Mean Weight (kg)
9	1	4	12	1	322	3P	M29	155	46.61	55.14	0	0	30	1.6	
9	2	4	12	1	322	3P	M29	127	46.55	55.38	0	0	30	1.6	
9	3	4	12	1	322	3P	M30	153	46.36	55.64	0	0	29	1.5	
9	4	4	12	2	322	3P	M30	147	46.33	55.66	0	0	30	1.5	
9	5	4	12	2	322	3P	L30	153	46.37	56.01	0	0	30	1.6	
9	6	4	12	2	322	3P	L30	114	46.30	56.10	0	0	30	1.5	
9	7	4	12	2	322	3P	L30	117	46.27	56.05	0	0	30	1.5	
9	8	4	12	2	321	3P	M30	78	46.22	55.77	0	0	30	1.5	
9	9	4	12	2	321	3P	M30	62	46.07	55.69	0	0	30	1.5	
9	10	4	12	2	321	3P	M31	70	45.95	55.67	0	0	30	1.6	
9	11	4	12	2	321	3P	M31	60	45.78	55.56	0	0	30	1.6	
9	12	4	12	2	321	3P	M31	71	45.79	55.47	0	0	30	1.6	
9	13	4	12	2	323	3P	M31	141	45.97	55.35	0	0	30	1.5	
9	14	4	12	2	323	3P	M31	156	45.97	55.22	0	0	30	1.6	
9	15	4	12	3	323	3P	M30	127	46.08	55.33	0	0	30	1.5	
9	16	4	12	3	323	3P	M30	120	46.14	55.26	0	0	30	1.5	
9	17	4	12	3	322	3P	M30	180	46.28	55.16	0	0	30	1.5	
9	18	4	12	3	324	3P	N30	110	46.38	54.57	0	0	30	1.5	
9	19	4	12	3	324	3P	N30	99	46.42	54.47	0	0	30	1.5	
9	20	4	12	3	324	3P	N30	115	46.23	54.72	0	0	30	1.5	
9	21	4	12	4	325	3P	N31	74	45.93	54.77	0	0	30	1.6	
9	22	4	12	4	325	3P	N31	84	45.82	54.60	0	0	30	1.6	
9	23	4	12	4	326	3P	N31	79	45.82	54.43	0	0	30	1.5	
9	24	4	12	4	326	3P	N31	83	45.71	54.37	0	0	30	1.6	
9	25	4	12	4	325	3P	N31	78	45.77	54.70	0	0	30	1.5	
9	26	4	12	4	325	3P	N31	68	45.79	54.90	0	0	30	1.7	
9	27	4	12	4	325	3P	N31	72	45.73	54.98	0	0	30	1.5	
9	28	4	12	4	321	3P	M31	70	45.60	55.47	0	0	25	1.2	
9	29	4	12	4	315	3P	M31	68	45.55	55.48	0	0	30	1.6	
9	30	4	12	4	315	3P	M32	71	45.47	55.51	0	0	30	1.6	
9	31	4	12	4	320	3P	M31	43	45.60	55.93	0	0	30	1.6	
9	32	4	12	5	320	3P	M31	48	45.69	55.97	0	0	30	1.5	
9	33	4	12	5	320	3P	M31	51	45.81	55.93	0	0	30	1.6	
9	34	4	12	5	321	3P	L31	53	45.93	56.03	0	0	30	1.5	
9	36	4	12	5	320	3P	L32	48	45.47	56.06	0	0	30	1.5	
9	37	4	12	5	315	3P	M32	75	45.30	55.77	3	3	30	1.5	1.0
9	38	4	12	5	319	3P	M32	137	45.32	55.11	12	6	30	1.5	0.5
9	39	4	12	5	319	3P	N32	109	45.29	54.98	6	4.5	30	1.5	0.8
9	40	4	12	5	325	3P	N32	86	45.34	54.71	0	0	30	1.5	
9	41	4	12	5	319	3P	N32	90	45.27	54.70	1	1	30	1.6	1.0
9	42	4	12	5	319	3P	N32	112	45.22	54.53	0	0	30	1.5	
9	43	4	12	5	319	3P	N32	125	45.15	54.69	4	4.5	30	1.6	1.1
9	44	4	12	6	318	3P	N32	189	45.07	54.71	90	49	30	1.5	0.5
9	46	4	12	7	707	3P	M32	358	45.10	55.16	16	10	30	1.5	0.6
9	47	4	12	7	319	3P	M32	166	45.09	55.27	9	4	30	1.6	0.4
9	48	4	12	7	707	3P	M32	330	45.02	55.37	39	22	30	1.5	0.6
9	49	4	12	8	318	3P	M33	217	44.92	55.72	74	40	30	1.5	0.5
9	50	4	12	8	708	3P	M33	374	44.87	55.68	10	6	30	1.5	0.6
9	51	4	12	8	708	3P	M33	374	44.88	55.94	155	91	30	1.5	0.6
9	52	4	12	8	315	3P	L32	85	45.14	56.03	3	2	30	1.5	0.7
9	53	4	12	8	316	3P	L32	239	45.38	56.43	11	4	30	1.5	0.4
9	54	4	12	8	706	3P	L32	303	45.50	56.57	6	2	30	1.7	0.3
9	55	4	12	8	317	3P	L31	138	45.70	56.65	90	37	30	1.7	0.4
9	56	4	12	8	317	3P	L31	150	45.73	56.68	89	27	30	1.6	0.3
9	57	4	12	8	320	3P	L31	51	45.88	56.60	0	0	30	1.5	
9	58	4	12	9	320	3P	L31	51	45.92	56.64	1	1	30	1.4	1.0
9	59	4	12	9	315	3P	L31	61	45.87	56.76	2	2	30	1.4	1.0
9	60	4	12	9	316	3P	L31	229	45.87	56.86	17	10	30	1.5	0.6
9	61	4	12	9	706	3P	L31	352	45.80	56.92	8	5	30	1.5	0.6
9	62	4	12	9	706	3P	K31	337	45.93	57.04	9	4	30	1.5	0.4
9	63	4	12	10	313	3P	K30	234	46.12	57.14	36	15	30	1.5	0.4
9	64	4	12	10	705	3P	K30	306	46.25	57.34	11	4	30	1.5	0.4
9	65	4	12	10	311	3P	K30	127	46.30	57.24	24	8	30	1.5	0.3
9	66	4	12	10	314	3P	L30	55	46.32	56.71	0	0	30	1.5	
9	67	4	12	10	314	3P	L30	55	46.20	56.62	0	0	30	1.5	
9	68	4	12	10	314	3P	L30	54	46.10	56.49	0	0	30	1.4	
9	69	4	12	10	314	3P	L30	52	46.12	56.69	0	0	24	1.2	
9	70	4	12	10	312	3P	L30	83	46.18	56.92	3	2	30	1.5	0.7
9	71	4	12	10	312	3P	K30	73	46.34	57.25	0	0	19	0.9	
9	73	4	12	10	705	3P	K30	314	46.41	57.45	8	2.5	22	1.1	0.3
9	74	4	12	10	313	3P	K30	232	46.45	57.42	91	29	30	1.5	0.3
9	75	4	12	11	311	3P	K29	145	46.85	57.09	23	10	30	1.5	0.4
9	76	4	12	11	310	3P	K29	220	46.90	57.13	8	3	30	1.5	0.4
9	77	4	12	11	310	3P	K29	252	46.92	57.19	21	8	30	1.5	0.4
9	78	4	12	11	713	3P	K29	417	46.58	57.89	6	2	30	1.5	0.3
9	79	4	12	11	713	3P	K30	472	46.45	57.90	1	0.1	30	1.6	0.1
9	80	4	12	11	713	3P	K30	475	46.23	57.92	5	2	30	1.5	0.4
9	81	4	12	11	713	3P	K30	485	46.09	57.63	3	1	30	1.4	0.3
9	82	4	12	11	712	3P	K31	456	45.78	57.39	1	0.2	30	1.5	0.2
9	83	4	12	11	712	3P	K31	447	45.69	57.32	0	0	30	1.5	
9	84	4	12	12	712	3P	K32	435	45.39	57.05	8	2	30	1.5	0.3
9	85	4	12	12	711	3P	L32	421	45.37	56.90	0	0	30	1.5	
9	86	4	12	12	711	3P	L32	397	45.05	56.50	8	2	30	1.6	0.3
9	87	4	12	12	711	3P	L33	391	44.89	56.62	5	2	30	1.6	0.4
9	88	4	12	12	317	3P	L33	106	44.98	56.09	0	0	30	1.5	
9	104	4	12	14	323	3P	M31	157	45.64	55.16	11	9	31	1.5	0.8
									Minimum		0.0	0.0	19.0	0.9	0.10
									Maximum		155.0	91.0	31.0	1.7	1.13
									Mean		10.8	5.1	29.7	1.5	0.52
									Median		0.0	0.0	30.0	1.5	0.44
									Standard Error		0.3	0.2	0.0	0.0	0.00
									Total		928.0	436.8			

Note: Sets 89-103 were tagging sets and are excluded from the stratified random survey

Table 10a Stratified Analysis Estimated Witch Abundance and Biomass

WITCH GEAC 3PS 2004 No Zone
ANALYSIS FOR TRIP 9 2004 VESSEL 49 ICNAF 3P SPECIES 0890

NUMBERS

STRATUM	NO.SETS	TOTAL	AV./SET	UNITS	TOTAL NO	VAR.
310	2	29.00	14.50	9255.	134204.	84.50
311	2	47.00	23.50	17903.	420716.	0.50
312	2	3.00	1.50	16281.	24422.	4.50
313	2	127.00	63.50	11147.	707837.	1512.50
314	4	0.00	0.00	61748.	0.	0.00
315	5	8.14	1.63	52357.	85268.	2.33
316	2	28.00	14.00	11147.	156058.	18.00
317	3	162.85	54.28	11620.	630766.	2214.04
318	2	164.00	82.00	8715.	714626.	128.00
319	6	31.13	5.19	66477.	344849.	20.93
320	6	1.07	0.18	79988.	14284.	0.19
321	7	0.00	0.00	73503.	0.	0.00
322	8	0.00	0.00	94648.	0.	0.00
323	5	11.00	2.20	47020.	103444.	24.20
324	3	0.00	0.00	33374.	0.	0.00
325	6	0.00	0.00	63775.	0.	0.00
326	2	0.00	0.00	11215.	0.	0.00
705	2	21.91	10.95	13174.	144313.	0.00
706	3	22.29	7.43	28509.	211864.	3.68
707	2	55.00	27.50	4999.	137480.	264.50
708	2	165.00	82.50	8512.	702263.	10512.50
711	3	12.19	4.06	37630.	152871.	14.36
712	3	9.00	3.00	49385.	148154.	19.00
713	4	15.15	3.79	57492.	217775.	4.94

TOTAL	TOTAL UPPER	TOTAL LOWER	AVERAGE MEAN	AVERAGE UPPER	AVERAGE LOWER
5051193.	8500788.	1601598.	5.81	9.77	1.84

EFFECTIVE DEGREES OF FREEDOM= 2 STUDENTS T-VALUE= 4.30 ALPHA=0.05

WEIGHTS

STRATUM	NO.SETS	TOTAL	AV./SET	UNITS	TOTAL NO	VAR.
310	2	11.00	5.50	9255.	50905.	12.50
311	2	18.00	9.00	17903.	161125.	2.00
312	2	2.00	1.00	16281.	16281.	2.00
313	2	44.00	22.00	11147.	245235.	98.00
314	4	0.00	0.00	61748.	0.	0.00
315	5	7.14	1.43	52357.	74796.	1.85
316	2	14.00	7.00	11147.	78029.	18.00
317	3	57.96	19.32	11620.	224495.	293.39
318	2	89.00	44.50	8715.	387815.	40.50
319	6	19.41	3.23	66477.	215011.	5.24
320	6	1.07	0.18	79988.	14284.	0.19
321	7	0.00	0.00	73503.	0.	0.00
322	8	0.00	0.00	94648.	0.	0.00
323	5	9.00	1.80	47020.	84636.	16.20
324	3	0.00	0.00	33374.	0.	0.00
325	6	0.00	0.00	63775.	0.	0.00
326	2	0.00	0.00	11215.	0.	0.00
705	2	7.41	3.70	13174.	48803.	0.17
706	3	10.76	3.59	28509.	102298.	2.74
707	2	32.00	16.00	4999.	79988.	72.00
708	2	161.00	80.50	8512.	685239.	11100.50
711	3	3.75	1.25	37630.	47037.	1.17
712	3	2.20	0.73	49385.	36215.	1.21
713	4	5.17	1.29	57492.	74239.	0.83

LOWER CONFIDENCE LIMIT IS LESS THAN OR EQUAL TO ZERO
****-VARIANCE TOO LARGE FOR VALID CONFIDENCE INTERVAL AT THIS VALUE OF ALPHA-****

TOTAL	TOTAL UPPER	TOTAL LOWER	AVERAGE MEAN	AVERAGE UPPER	AVERAGE LOWER
2626434.	11066185.	-5813318.	3.02	12.72	-6.68

EFFECTIVE DEGREES OF FREEDOM= 1 STUDENTS T-VALUE= 12.71 ALPHA=0.05

Table 10b Stratified Analysis Estimated Witch Abundance and Biomass: Comparison for 1998-2004

3Ps Witch Estimates						
"numbers"abundance (millions of fish)						
	95% upper limit	Estimated	95% lower limit	95% upper limit	Mean #fish /tow	95% lower limit
1998	7.20	4.65	2.10	8.7	5.6	2.5
1999	46.48	23.70	0.92	55.9	28.5	1.1
2000	18.58	6.33	0	22.3	7.6	0
2001	14.47	7.87	1.28	16.6	9.1	1.5
2002	24.05	4.83	0	28.0	5.6	0
2003	17.1	7.1	0	19.7	8.1	0
2004	8.5	5.0	1.6	9.8	5.8	1.8
"weights" biomass (ktonnes)						
	95% upper limit	Estimated	95% lower limit	95% upper limit	Mean catch /tow (kg)	95% lower limit
1998	3.07	1.80	0.53	3.7	2.2	0.6
1999	19.11	9.60	0.95	23.0	11.5	0.1
2000	8.76	2.95	0	10.5	3.6	0
2001	6.61	3.60	0.59	7.6	4.1	0.7
2002	10.86	2.16	0	12.7	2.5	0
2003	7.2	2.99	0	8.3	3.4	0
2004	11.1	2.63	0	12.7	3.0	0
Note: variance too large for valid lower limits for 2000, 2002-4. Negative limit computed. Value of 0 reported.						

Table 11a Stratified Analysis Witch Age Composition, Numbers per Standard Tow

WITCH GEAC 2004 3PS No Zone (S1 BY AGE)
ANALYSIS FOR TRIP 9 2004 VESSEL 49 ICNAF 3P

AGE COMPOSITION-NUMBERS PER STANDARD TOW

SUMMARY TABLE
SPECIES:SPECIES 0890
SEX:COMBINED

AGE IN YEARS	TOTAL NUMBERS	UPPER LIMIT	LOWER LIMIT	MEAN PER TOW	UPPER LIMIT	LOWER LIMIT	D.F.
0 to 4	0.	0.	0.	0.00	0.00	0.00	0
5.0	50207.	103273.	-2858.	0.06	0.12	0.00	2
6.0	314421.	467990.	160851.	0.36	0.54	0.18	6
7.0	713130.	1223835.	202424.	0.82	1.41	0.23	3
8.0	1114828.	1691122.	538534.	1.28	1.94	0.62	3
9.0	1185470.	1697486.	673455.	1.36	1.95	0.77	3
10.0	802644.	3311277.	-1705988.	0.92	3.81	-1.96	1
11.0	484011.	2397541.	-1429518.	0.56	2.76	-1.64	1
12.0	247129.	1231848.	-737589.	0.28	1.42	-0.85	1
13.0	124873.	215544.	34203.	0.14	0.25	0.04	7
14.0	14480.	41091.	-12131.	0.02	0.05	-0.01	4
UNKNOWN	0.	0.	0.	0.00	0.00	0.00	0
TOTAL	5051193.	8500788.	1601598.	5.81	9.77	1.84	2

ESTIMATION TYPE:STANDARD TRANSFORMATION TYPE:NONE CONFIDENCE LEVEL: 0.95%
****-ONE OR MORE OF THE LOWER LIMITS IN THE ABOVE TABLE IS LESS THAN OR EQUAL TO ZERO.
VARIANCE IS TOO LARGE FOR VALID CONFIDENCE LIMITS ****

Table 11b Stratified Analysis Estimated Witch Abundance Age Distribution: 1998-2004

	3Ps Witch Estimates													
	"number" abundance (millions of fish)							Mean #fish/tow						
Age (years)	1998	1999	2000	2001	2002	2003	2004	1998	1999	2000	2001	2002	2003	2004
5	0.09	0.06	0.02	0.13	0.08	0.10	0.05	0.11	0.07	0.03	0.15	0.09	0.11	0.06
6	0.09	0.50	0.08	0.32	0.26	0.24	0.31	0.10	0.60	0.10	0.37	0.30	0.27	0.36
7	0.47	2.21	0.41	0.72	0.68	0.79	0.71	0.57	2.65	0.50	0.83	0.80	0.91	0.82
8	1.05	6.00	1.10	1.43	0.95	1.55	1.11	1.27	7.21	1.32	1.64	1.11	1.79	1.28
9	1.61	6.79	2.30	2.44	1.32	2.32	1.19	1.93	8.16	2.76	2.80	1.53	2.67	1.36
10	0.83	5.13	1.62	1.72	1.02	1.31	0.80	1.00	6.16	1.95	1.98	1.19	1.51	0.92
11	0.39	1.97	0.48	0.79	0.35	0.46	0.48	0.46	2.36	0.58	0.90	0.41	0.53	0.56
12	0.09	0.74	0.22	0.27	0.13	0.20	0.25	0.11	0.88	0.27	0.31	0.15	0.22	0.28
13	0.02	0.13	0.07	0.06	0.03	0.09	0.12	0.02	0.16	0.08	0.07	0.04	0.10	0.14
14	0.00	0.00	0.01	0.00	0.01		0.01	0.00	0.00	0.01	0.00	0.01		0.02

Table 12a Witch abundance estimates (thousands of fish)
from GEAC surveys in NAFO Subdivision 3Ps from 1998-2004

Depth range (fathoms)	Strata	Vessel Trip #Sets Mean Date sq. mi.	Pennysmart 3 86 06-Dec 1998	Pennysmart 4 90 27-Nov 1999	Pennysmart 5 73 10-Dec 2000	Pennysmart 6 91 05-Dec 2001	Pennysmart 7 75 29-Nov 2002	Pennysmart 8 89 04-Dec 2003	Pennysmart 9 86 06-Dec 2004
<30	314	974	0	0	0	21	107	0	0
	320	1320	100	0	0	10	12	44	14
		Subtotal	100	0	0	31	119	44	14
31-50	312	272	41	15	8	16	0	89	24
	315	827	10	35	0	0	0	134	85
	321	1189	0	0	0	13	15	22	0
	325	944	0	0	0	0	0	0	0
	326	166	0	0	0	0	-	0	0
		Subtotal	51	50	8	29	15	245	109
51-100	311	317	0	752	18	45	299	297	421
	317	193	0	120	0	0	116	261	631
	319	984	1548	19271	4416	3424	632	465	345
	322	1567	0	11	16	0	0	16	0
	323	696	0	20	0	0	16	0	103
	324	494	0	0	0	0	17	0	0
		Subtotal	1548	20174	4450	3469	1080	1039	1500
101-150	310	170	69	116	116	0	9	37	134
	313	165	290	69	123	903	1474	1594	708
	316	189	591	1828	619	223	125	212	156
	318	129	290	35	22	1316	748	9	715
		Subtotal	1240	2048	880	2442	2356	1852	1713
151-200	705	195	244	184	155	92	173	287	144
	706	476	551	580	459	285	396	140	219
	707	74	35	77	53	320	55	1882	137
		Subtotal	830	841	667	697	624	2309	500
201-300	708	126	38	38	24	417	30	655	702
	711	593	-	-	-	94	56	132	153
	712	731	230	123	198	319	214	301	148
	713	851	613	431	107	374	337	483	218
		Subtotal	881	592	329	1204	637	1571	1221
	Total [1]		4,650	23,705	6,334	7,872	4,831	7,060	5,057

[1] Totals are for all strata fished. Individual strata totals rounded to nearest 1000.

Table 12b Witch biomass estimates (t)
from GEAC surveys in NAFO Subdivision 3Ps from 1998-2004

Depth range (fathoms)	Strata	Vessel Trip #Sets Mean Date sq. mi.	Pennysmart 3 86 06-Dec 1998	Pennysmart 4 90 27-Nov 1999	Pennysmart 5 73 10-Dec 2000	Pennysmart 6 91 05-Dec 2001	Pennysmart 7 75 29-Nov 2002	Pennysmart 8 89 04-Dec 2003	Pennysmart 9 86 06-Dec 2004
<30	314	974	0	0	0	15	58	0	0
	320	1320	28	0	0	3	6	33	14
		Subtotal	28	0	0	18	64	33	14
31-50	312	272	15	8	12	11	0	44	16
	315	827	4	9	0	0	0	98	75
	321	1189	0	0	0	9	15	44	0
	325	944	0	0	0	0	0	0	0
	326	166	0	0	0	0	-	0	0
		Subtotal	19	17	12	20	15	186	91
51-100	311	317	0	215	4	20	116	94	161
	317	193	0	38	0	0	38	105	224
	319	984	745	7938	2105	1634	343	241	215
	322	1567	0	5	8	0	0	16	0
	323	696	0	14	0	0	16	0	85
	324	494	0	0	0	0	7	0	0
		Subtotal	745	8210	2117	1654	520	456	685
101-150	310	170	14	32	44	0	5	19	51
	313	165	101	39	59	422	631	682	245
	316	189	245	821	254	78	73	76	78
	318	129	98	22	17	586	355	4	388
		Subtotal	458	914	374	1086	1064	781	762
151-200	705	195	67	59	56	30	65	123	49
	706	476	198	178	192	112	141	48	102
	707	74	33	36	40	167	34	775	80
		Subtotal	298	273	288	309	240	946	231
201-300	708	126	11	17	13	220	21	273	685
	711	593	-	-	-	43	19	39	47
	712	731	56	45	91	94	91	97	36
	713	851	188	124	59	158	127	182	74
		Subtotal	255	186	163	515	258	591	842
	Total [1]		1,803	9,600	2,954	3,602	2,161	2,993	2,625

[1] Totals are for all strata fished. Individual strata totals rounded to nearest 1000.

Table 13 Summary of Haddock Catches for Stratified Random Survey Sets, NAFO Subdivision 3Ps, 1-14 Dec 2004.

M.V. Pennysmart Trip	Set	Year	Month	Day	StrLin	Division	Unit Area	Depth (m)	Set Location Lat (N)	Long (W)	HADDOCK Catch # of Fish	Catch Weight (kg)	Set Duration (min)	Tow Distance (n.mi.)	HADDOCK Mean Weight (kg)
9	1	4	12	1	322	3P	M29	155	46.61	55.14	0	0	30	1.6	
9	2	4	12	1	322	3P	M29	127	46.55	55.38	0	0	30	1.6	
9	3	4	12	1	322	3P	M30	153	46.38	55.64	0	0	29	1.5	
9	4	4	12	2	322	3P	M30	147	46.33	55.66	0	0	30	1.5	
9	5	4	12	2	322	3P	L30	153	46.37	56.01	0	0	30	1.6	
9	6	4	12	2	322	3P	L30	114	46.30	56.10	0	0	30	1.5	
9	7	4	12	2	322	3P	L30	117	46.27	56.05	0	0	30	1.5	
9	8	4	12	2	321	3P	M30	78	46.22	55.77	0	0	30	1.5	
9	9	4	12	2	321	3P	M30	62	46.07	55.69	0	0	30	1.5	
9	10	4	12	2	321	3P	M31	70	45.96	55.67	0	0	30	1.6	
9	11	4	12	2	321	3P	M31	60	45.78	55.56	0	0	30	1.6	
9	12	4	12	2	321	3P	M31	71	45.79	55.47	0	0	30	1.6	
9	13	4	12	2	323	3P	M31	141	45.97	55.35	0	0	30	1.5	
9	14	4	12	2	323	3P	M31	156	45.97	55.22	0	0	30	1.6	
9	15	4	12	3	323	3P	M30	127	46.08	55.33	0	0	30	1.5	
9	16	4	12	3	323	3P	M30	120	46.14	55.26	0	0	30	1.5	
9	17	4	12	3	322	3P	M30	180	46.28	55.16	0	0	30	1.5	
9	18	4	12	3	324	3P	N30	110	46.38	54.57	0	0	30	1.5	
9	19	4	12	3	324	3P	N30	99	46.42	54.47	0	0	30	1.5	
9	20	4	12	3	324	3P	N30	115	46.23	54.72	0	0	30	1.5	
9	21	4	12	4	325	3P	N31	74	45.93	54.77	0	0	30	1.6	
9	22	4	12	4	325	3P	N31	84	45.82	54.60	0	0	30	1.6	
9	23	4	12	4	326	3P	N31	79	45.82	54.43	0	0	30	1.5	
9	24	4	12	4	326	3P	N31	83	45.71	54.37	0	0	30	1.6	
9	25	4	12	4	325	3P	N31	78	45.77	54.70	0	0	30	1.5	
9	26	4	12	4	325	3P	N31	66	45.79	54.90	0	0	30	1.7	
9	27	4	12	4	325	3P	N31	72	45.73	54.98	0	0	30	1.5	
9	28	4	12	4	321	3P	M31	70	45.60	55.47	0	0	25	1.2	
9	29	4	12	4	315	3P	M31	68	45.55	55.48	0	0	30	1.6	
9	30	4	12	4	315	3P	M32	71	45.47	55.51	0	0	30	1.6	
9	31	4	12	4	320	3P	M31	43	45.60	55.93	1	4	30	1.6	4.0
9	32	4	12	5	320	3P	M31	46	45.69	55.97	0	0	30	1.5	
9	33	4	12	5	320	3P	M31	51	45.81	55.93	0	0	30	1.6	
9	34	4	12	5	321	3P	L31	53	45.93	56.03	0	0	30	1.5	
9	36	4	12	5	320	3P	L32	48	45.47	56.06	0	0	30	1.5	
9	37	4	12	5	315	3P	M32	75	45.30	55.77	0	0	30	1.5	
9	38	4	12	5	319	3P	M32	137	45.32	55.11	1	1.5	30	1.5	1.5
9	39	4	12	5	319	3P	N32	109	45.29	54.98	0	0	30	1.5	
9	40	4	12	5	325	3P	N32	86	45.34	54.71	0	0	30	1.5	
9	41	4	12	5	319	3P	N32	90	45.27	54.70	0	0	30	1.6	
9	42	4	12	5	319	3P	N32	112	45.22	54.53	0	0	30	1.5	
9	43	4	12	5	319	3P	N32	125	45.15	54.69	0	0	30	1.6	
9	44	4	12	6	318	3P	N32	189	45.07	54.71	82	158	30	1.5	1.9
9	46	4	12	7	707	3P	M32	358	45.10	55.16	0	0	30	1.5	
9	47	4	12	7	319	3P	M32	166	45.09	55.27	51	98	30	1.6	1.9
9	48	4	12	7	707	3P	M32	330	45.02	55.37	1	2	30	1.5	2.0
9	49	4	12	8	318	3P	M33	217	44.92	55.72	39	46	30	1.5	1.2
9	50	4	12	8	708	3P	M33	374	44.87	55.68	0	0	30	1.5	
9	51	4	12	8	708	3P	M33	374	44.88	55.94	0	0	30	1.5	
9	52	4	12	8	315	3P	L32	85	45.14	56.03	0	0	30	1.5	
9	53	4	12	8	316	3P	L32	239	45.39	56.43	1	2.5	30	1.5	2.5
9	54	4	12	8	706	3P	L32	303	45.50	56.57	0	0	30	1.7	
9	55	4	12	8	317	3P	L31	138	45.70	56.65	0	0	30	1.7	
9	56	4	12	8	317	3P	L31	150	45.73	56.68	0	0	30	1.6	
9	57	4	12	8	320	3P	L31	51	45.88	56.60	0	0	30	1.5	
9	58	4	12	9	320	3P	L31	51	45.92	56.64	0	0	30	1.4	
9	59	4	12	9	315	3P	L31	61	45.87	56.76	1	5	30	1.4	5.0
9	60	4	12	9	316	3P	L31	229	45.87	56.86	1	4	30	1.5	4.0
9	61	4	12	9	706	3P	L31	352	45.80	56.92	0	0	30	1.5	
9	62	4	12	9	706	3P	K31	337	45.93	57.04	0	0	30	1.5	
9	63	4	12	10	313	3P	K30	234	46.12	57.14	1	3	30	1.5	3.0
9	64	4	12	10	705	3P	K30	306	46.25	57.34	0	0	30	1.5	
9	65	4	12	10	311	3P	K30	127	46.30	57.24	0	0	30	1.5	
9	66	4	12	10	314	3P	L30	55	46.32	56.71	0	0	30	1.5	
9	67	4	12	10	314	3P	L30	55	46.20	56.62	0	0	30	1.5	
9	68	4	12	10	314	3P	L30	54	46.10	56.49	0	0	30	1.4	
9	69	4	12	10	314	3P	L30	52	46.12	56.69	0	0	24	1.2	
9	70	4	12	10	312	3P	L30	83	46.18	56.92	0	0	30	1.5	
9	71	4	12	10	312	3P	K30	73	46.34	57.25	0	0	19	0.9	
9	73	4	12	10	705	3P	K30	314	46.41	57.45	0	0	22	1.1	
9	74	4	12	10	313	3P	K30	232	46.45	57.42	0	0	30	1.5	
9	75	4	12	11	311	3P	K29	145	46.85	57.09	0	0	30	1.5	
9	76	4	12	11	310	3P	K29	220	46.90	57.13	16	38	30	1.5	2.4
9	77	4	12	11	310	3P	K29	252	46.92	57.19	0	0	30	1.5	
9	78	4	12	11	713	3P	K29	417	46.58	57.69	0	0	30	1.5	
9	79	4	12	11	713	3P	K30	472	46.45	57.90	0	0	30	1.6	
9	80	4	12	11	713	3P	K30	475	46.23	57.92	0	0	30	1.5	
9	81	4	12	11	713	3P	K30	465	46.09	57.63	0	0	30	1.4	
9	82	4	12	11	712	3P	K31	456	45.78	57.39	0	0	30	1.5	
9	83	4	12	11	712	3P	K31	447	45.69	57.32	0	0	30	1.5	
9	84	4	12	12	712	3P	K32	435	45.39	57.05	0	0	30	1.5	
9	85	4	12	12	711	3P	L32	421	45.37	56.90	0	0	30	1.5	
9	86	4	12	12	711	3P	L32	397	45.05	56.50	0	0	30	1.6	
9	87	4	12	12	711	3P	L33	391	44.89	56.62	0	0	30	1.6	
9	88	4	12	12	317	3P	L33	108	44.98	56.09	0	0	30	1.5	
9	104	4	12	14	323	3P	M31	157	45.64	55.16	0	0	31	1.5	
									Minimum		0.0	0.0	19.0	0.9	1.18
									Maximum		82.0	158.0	31.0	1.7	5.00
									Mean		2.3	4.2	29.7	1.5	2.87
									Median		0.0	0.0	30.0	1.5	2.36
									Standard Error		0.1	0.2	0.0	0.0	0.01
									Total		195.0	362.0			

Note: Sets 89-103 were tagging sets and are excluded from the stratified random survey

Table 14 Haddock Catch Summary from GEAC fall surveys in NAFO Subdivision 3Ps from 1997-2004

Vessel	Pennysmart	Pennysmart	Pennysmart	Pennysmart	Pennysmart	Pennysmart	Pennysmart	Pennysmart
Trip	2	3	4	5	6	7	8	9
#Sets	84	86	90	73	91	75	89	86
Mean Date	12-Dec	06-Dec	27-Nov	10-Dec	05-Dec	29-Nov	04-Dec	06-Dec
	1997	1998	1999	2000	2001	2002	2003	2004
Set Numbers								
#Sets w Haddock	7	9	9	14	18	12	9	11
Maximum	50	11	44	91	853	142	483	82
Mean	1.4	0.4	1.7	3.3	12.6	4.2	7.3	2.3
Total	118	35	152	238	1151	317	740	195
Set Weights (kg)								
Maximum	130.0	26.0	136.5	150.0	618.4	179.4	630.8	158.0
Mean	3.8	1.2	4.4	4.7	11.7	5.5	10.3	4.2
Total	320.0	105.2	396.4	341.1	1067.6	409.4	1038.3	362.0
Mean Fish Weight (kg)	2.7	3.0	2.6	1.4	0.9	1.3	1.4	1.9
Largest Sets	1997	1998	1999	2000	2001	2002	2003	2004
1 - Weight/#s	130/50	26/11	136.5/44	150/91	618.4/853	179.4/142	630.8/483	158/82
2	111.4/34	16.6/5	96/27	46/30	101.2/88	161/136	313/192	98/51
3	37.4/16	15/5	45/25	25/30	90.5/53	22/17	45/34	46/39
4	25/13	14/5	42/19	25/18	50.8/50	11/5	18/15	38/16
5	14.6/3	10/3	39.6/13	21/16	49.5/39	10/5	18/11	5/1

Table 15a Haddock abundance estimates (thousands of fish) from GEAC surveys in NAFO Subdivision 3Ps from 1997-2004

Depth range (fathoms)	Strata	Vessel / Trip / #Sets / Mean Date / sq. mi.	Pennysmart 2 12-Dec 1997	Pennysmart 3 06-Dec 1998	Pennysmart 4 27-Nov 1999	Pennysmart 5 10-Dec 2000	Pennysmart 6 05-Dec 2001	Pennysmart 7 29-Nov 2002	Pennysmart 8 04-Dec 2003	Pennysmart 9 06-Dec 2004
<30	314	974	0	25	62	0	648	10	0	0
	320	1320	0	0	0	400	130	0	0	13
		Subtotal	0	25	62	400	778	10	0	13
31-50	312	272	0	0	0	147	0	8	15	0
	315	827	0	0	0	13	0	0	0	11
	321	1189	0	0	0	0	0	0	0	0
	325	944	0	0	0	0	0	0	0	0
	326	166	0	0	0	0	0	.	0	0
		Subtotal	0	0	0	160	0	8	15	11
51-100	311	317	0	0	0	27	9	0	0	0
	317	193	0	0	0	0	12	6	0	0
	319	984	823	123	407	1658	211	1629	377	541
	322	1567	.	0	0	0	0	0	0	0
	323	696	0	0	0	0	0	0	0	0
	324	494	.	0	0	0	0	0	0	0
		Subtotal	823	123	407	1685	232	1635	377	541
101-150	310	170	14	23	0	51	231	37	56	74
	313	165	0	6	139	89	240	5	5	6
	316	189	6	0	72	167	507	21	5	11
	318	129	61	38	275	46	4039	630	3092	527
		Subtotal	81	67	486	353	5017	693	3158	618
151-200	705	195	0	0	0	0	0	0	0	0
	706	476	0	0	0	0	0	10	0	0
	707	74	0	0	0	0	7	0	37	3
		Subtotal	0	0	0	0	7	10	37	3
201-300	708	126	.	4	0	0	0	0	0	0
	711	593	.	.	.	.	0	0	0	0
	712	731	.	0	0	0	0	0	0	0
	713	851	.	0	0	0	0	0	0	0
		Subtotal	0	4	0	0	0	0	0	0
	Total [1]		904	219	955	2,598	6,034	2,356	3,587	1,186

[1] Totals are for all strata fished. Individual strata totals rounded to nearest 1000.
. denotes strata not fished

Table 15b Haddock biomass estimates (t) from GEAC surveys in NAFO Subdivision 3Ps from 1997-2004

Depth range (fathoms)	Strata	Vessel / Trip / #Sets / Mean Date / sq. mi.	Pennysmart 2 12-Dec 1997	Pennysmart 3 06-Dec 1998	Pennysmart 4 27-Nov 1999	Pennysmart 5 10-Dec 2000	Pennysmart 6 05-Dec 2001	Pennysmart 7 29-Nov 2002	Pennysmart 8 04-Dec 2003	Pennysmart 9 06-Dec 2004
<30	314	974	0	123	25	0	1312	29	0	0
	320	1320	0	0	0	200	508	0	0	50
		Subtotal	0	123	25	200	1820	29	0	50
31-50	312	272	0	0	0	171	0	23	53	0
	315	827	0	0	0	13	0	0	0	56
	321	1189	0	0	0	0	0	0	0	0
	325	944	0	0	0	0	0	0	0	0
	326	166	0	0	0	0	0	.	0	0
		Subtotal	0	0	0	184	0	23	53	56
51-100	311	317	0	0	0	30	12	0	0	0
	317	193	0	0	0	0	14	9	0	0
	319	984	2297	327	1139	2823	483	2098	499	1035
	322	1567	.	0	0	0	0	0	0	0
	323	696	0	0	0	0	0	0	0	0
	324	494	.	0	0	0	0	0	0	0
		Subtotal	2297	327	1139	2853	509	2107	499	1035
101-150	310	170	68	65	0	60	235	69	95	176
	313	165	0	20	234	86	296	10	13	17
	316	189	1	0	251	256	584	57	8	36
	318	129	115	112	767	103	2945	754	4309	889
		Subtotal	184	197	1252	505	4060	890	4425	1118
151-200	705	195	0	0	0	0	0	0	0	0
	706	476	0	0	0	0	0	14	0	0
	707	74	0	0	0	0	5	0	45	5
		Subtotal	0	0	0	0	5	14	45	5
201-300	708	126	.	20	0	0	0	0	0	0
	711	593	.	.	.	.	0	0	0	0
	712	731	.	0	0	0	0	0	0	0
	713	851	.	0	0	0	0	0	0	0
		Subtotal	0	20	0	0	0	0	0	0
	Total [1]		2,481	667	2,416	3,742	6,394	3,063	5,022	2,264

[1] Totals are for all strata fished. Individual strata totals rounded to nearest 1000.
. denotes strata not fished

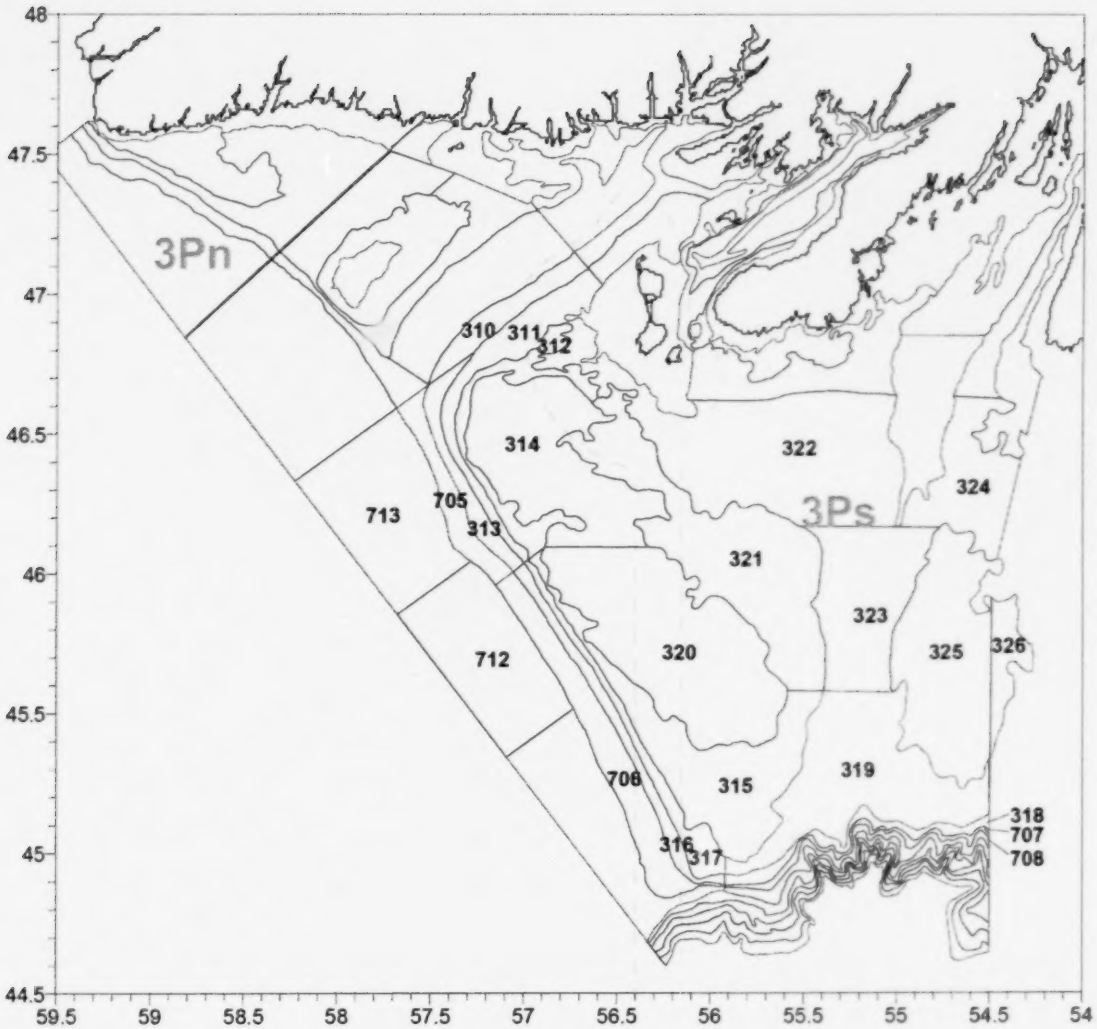


Figure 1 Stratum boundaries within NAFO Division 3P. Numbered strata indicate those surveyed during fall GEAC bottom trawl survey of Subdivision 3Ps. Dashed line is boundary of French economic zone which was not surveyed.

Figure 2a 2004 3Ps Survey Net Doors

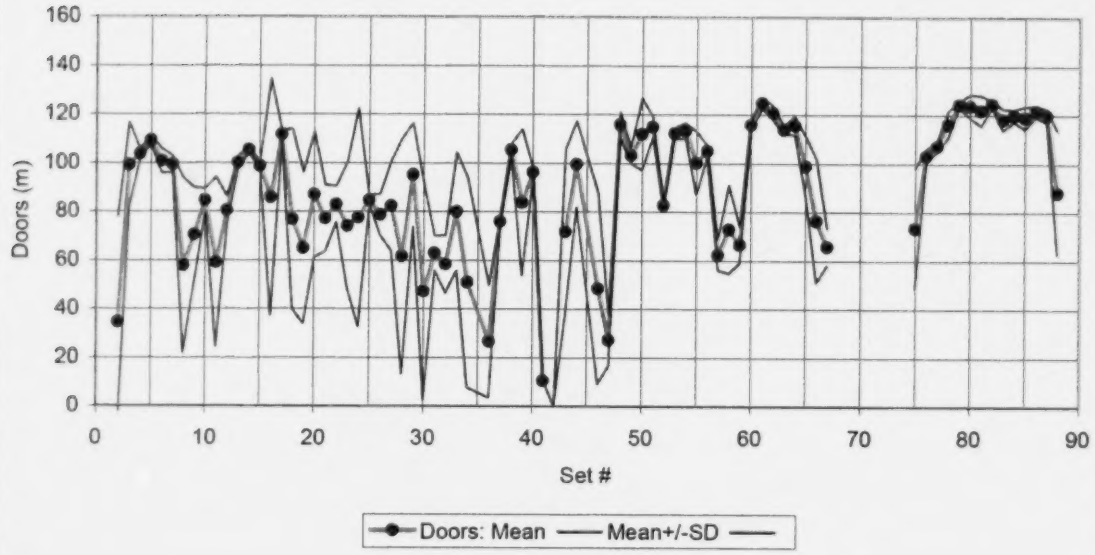
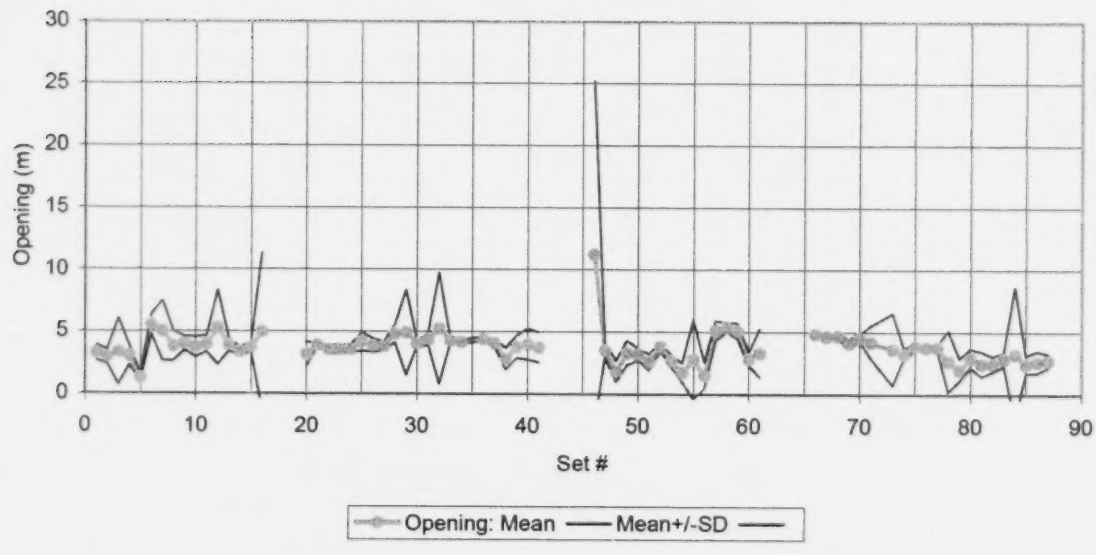


Figure 2b 2004 3Ps Survey Net Opening



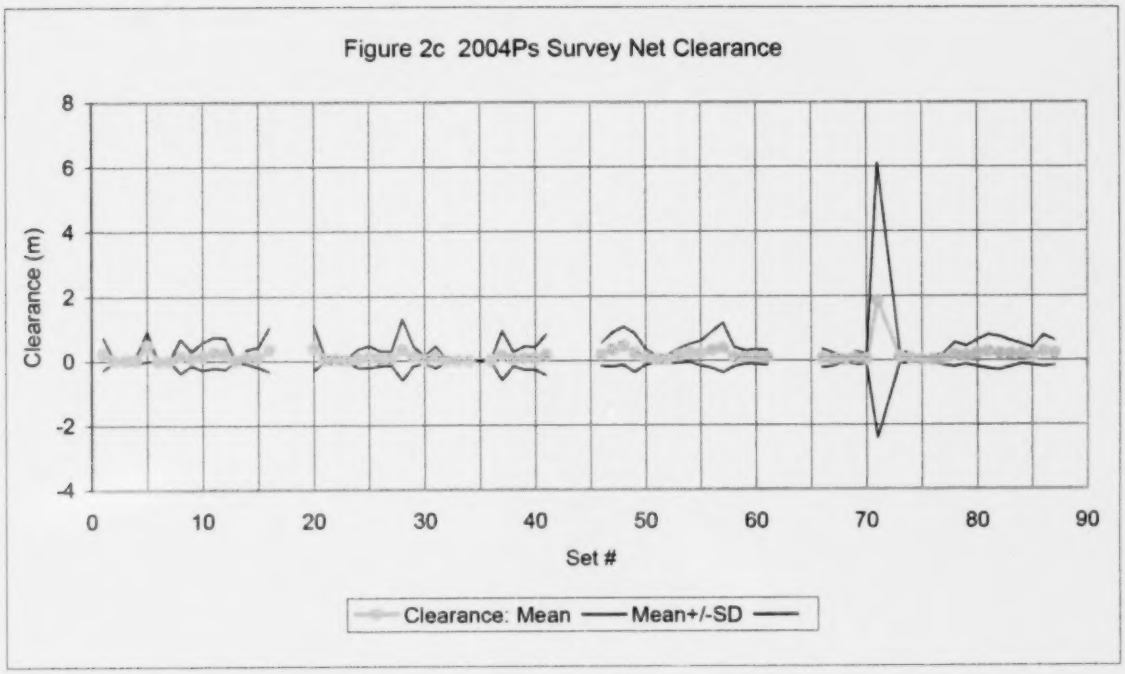


Figure 2c 2004Ps Survey Net Clearance
Clearance (m)
8
6
4
2
0
-2
-4
0
10
20
30
40
50
60
70
80
90
Set #
Clearance: Mean
Mean+/-SD

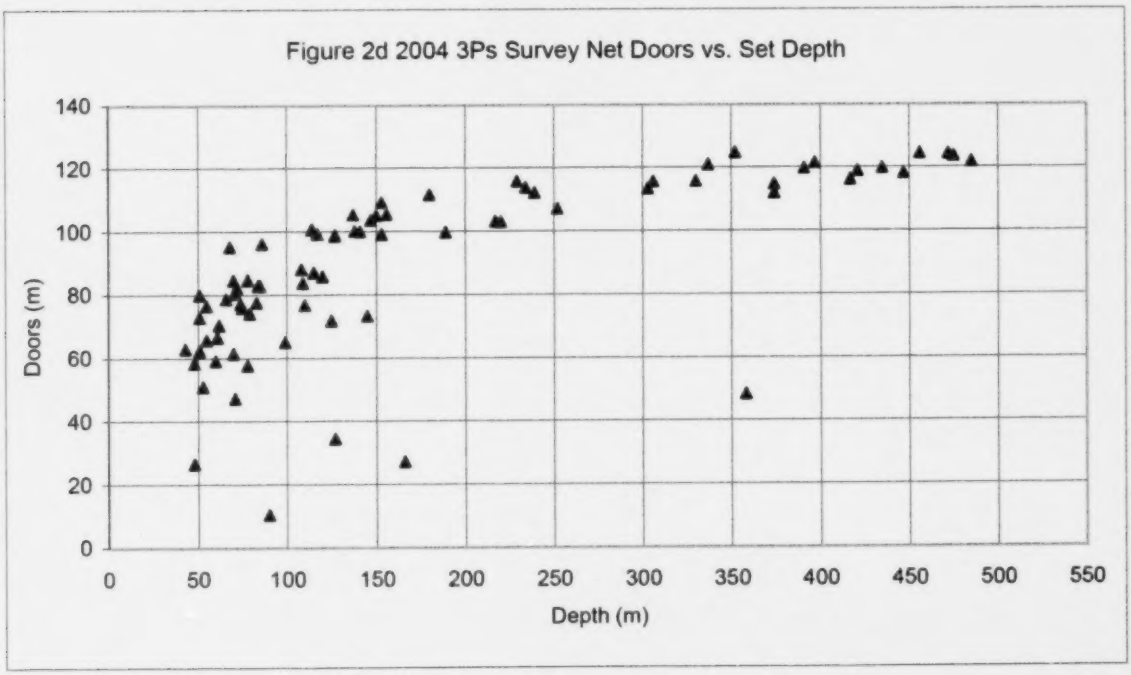


Figure 2d 2004 3Ps Survey Net Doors vs. Set Depth
Doors (m)
140
120
100
80
60
40
20
0
0
50
100
150
200
250
300
350
400
450
500
550
Depth (m)

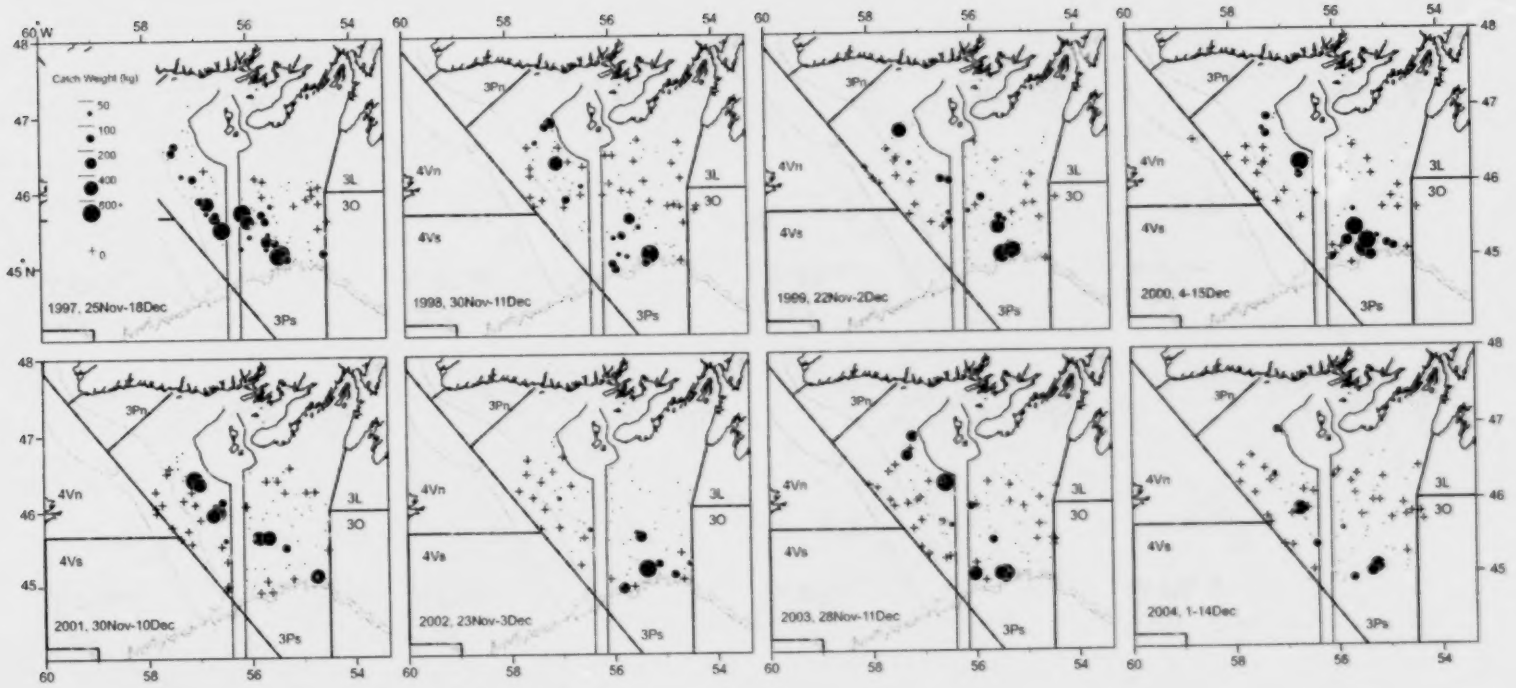


Figure 3 Cod Catch Weight Distribution from GEAC Stratified Random Surveys, 3Ps, 1997-2004. 200, 400, and 800 m depth contours are shown.

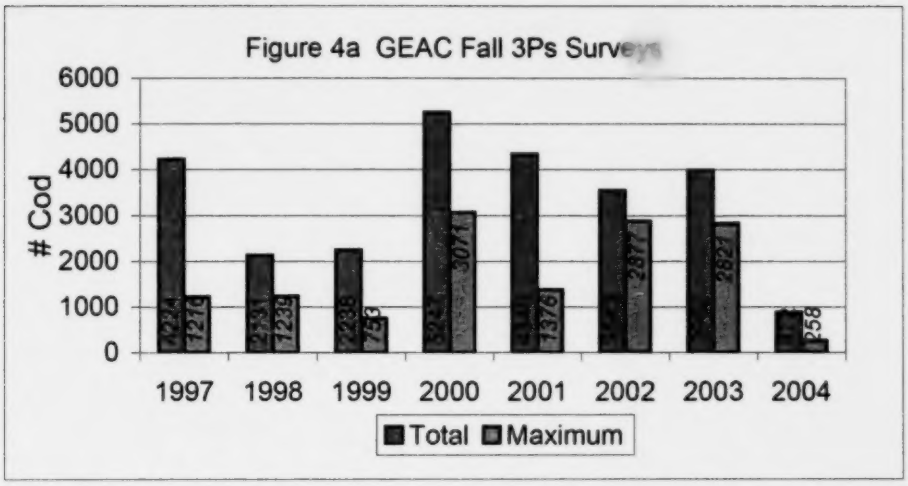


Figure 4a GEAC Fall 3Ps Surveys
Cod
6000
5000
4000
3000
2000
1000
0
1997
1998
1999
2000
2001
2002
2003
2004
Total
Maximum

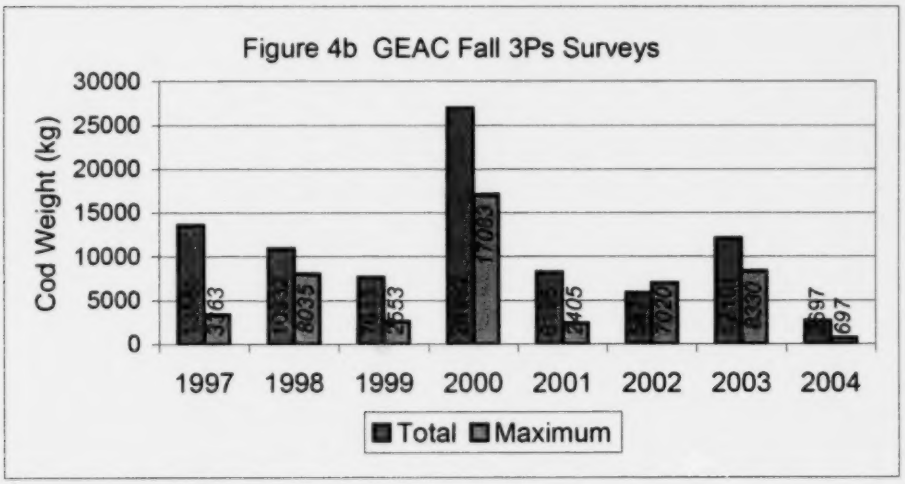


Figure 4b GEAC Fall 3Ps Surveys
Cod Weight (kg)
30000
25000
20000
15000
10000
5000
0
1997
1998
1999
2000
2001
2002
2003
2004
Total
Maximum

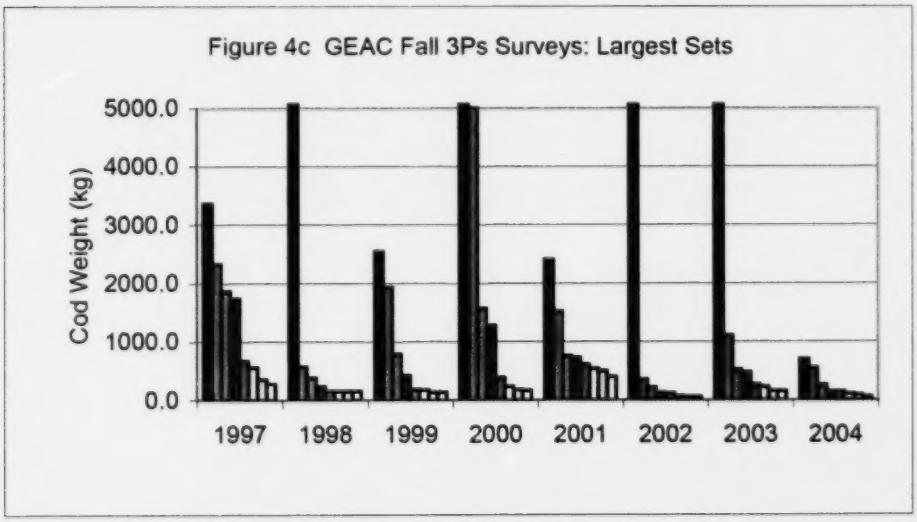


Figure 4c GEAC Fall 3Ps Surveys: Largest Sets
Cod Weight (kg)
5000.0
4000.0
3000.0
2000.0
1000.0
0.0
1997
1998
1999
2000
2001
2002
2003
2004

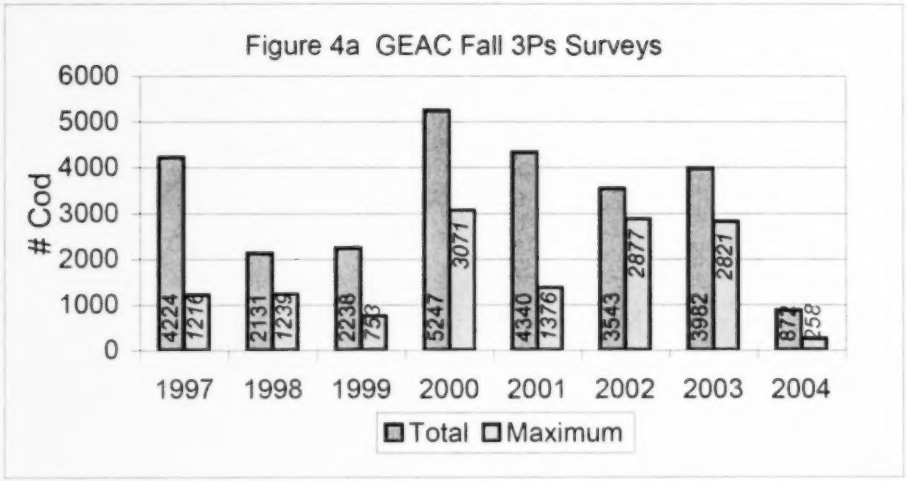


Figure 4a GEAC Fall 3Ps Surveys
Cod
6000
5000
4000
3000
2000
1000
0
4224
1216
2131
1239
2238
733
5247
3071
4340
1376
3543
2877
3982
2821
871
258
1997
1998
1999
2000
2001
2002
2003
2004
Total
Maximum

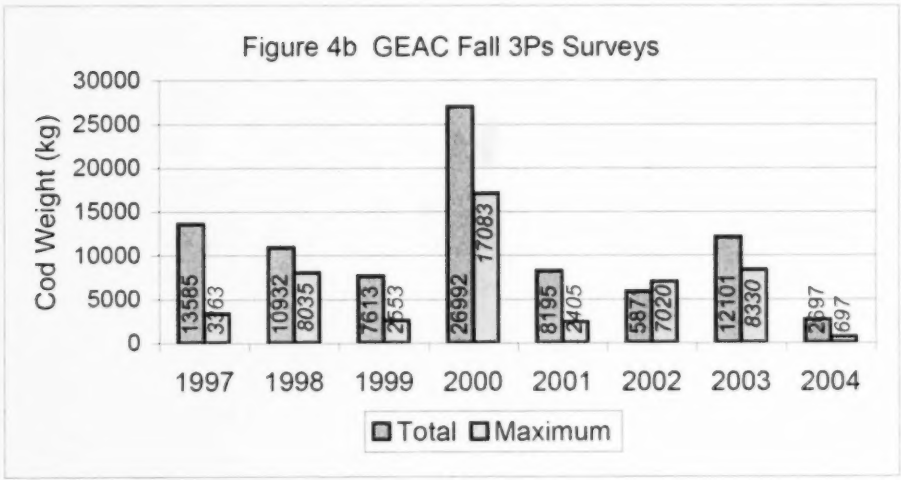


Figure 4b GEAC Fall 3Ps Surveys
Cod Weight (kg)
30000
25000
20000
15000
10000
5000
0
13585
3163
10932
8035
7613
2653
26992
17083
8195
2405
5871
7020
12101
8330
2697
1697
1997
1998
1999
2000
2001
2002
2003
2004
Total
Maximum

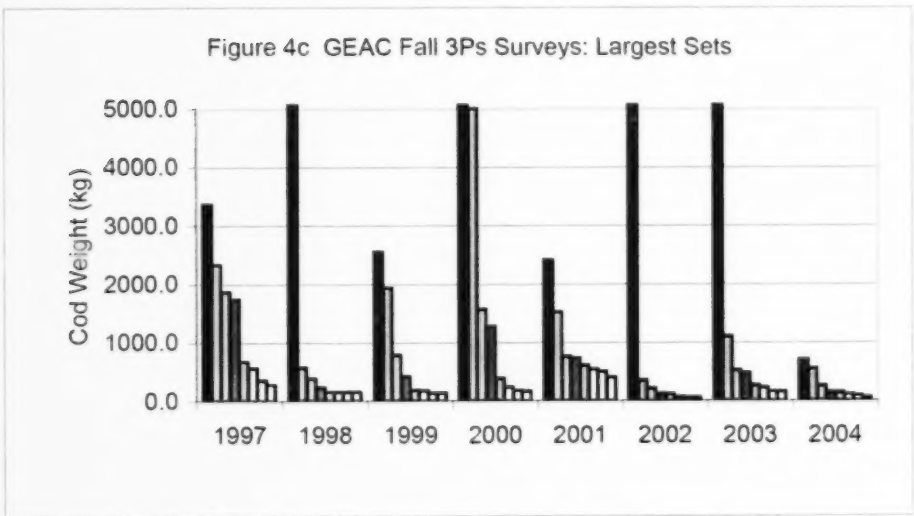


Figure 4c GEAC Fall 3Ps Surveys: Largest Sets
Cod Weight (kg)
5000.0
4000.0
3000.0
2000.0
1000.0
0.0
1997
1998
1999
2000
2001
2002
2003
2004

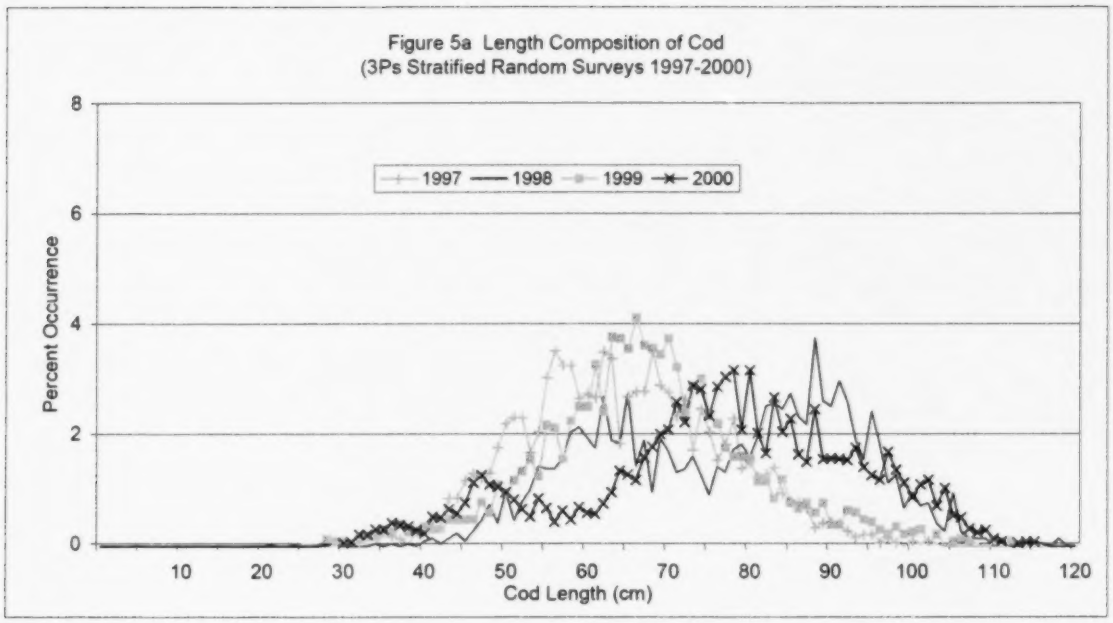


Figure 5a Length Composition of Cod
(3Ps Stratified Random Surveys 1997-2000)
1997
1998
1999
2000
Percent Occurrence
Cod Length (cm)
0
2
4
6
8
10
20
30
40
50
60
70
80
90
100
110
120

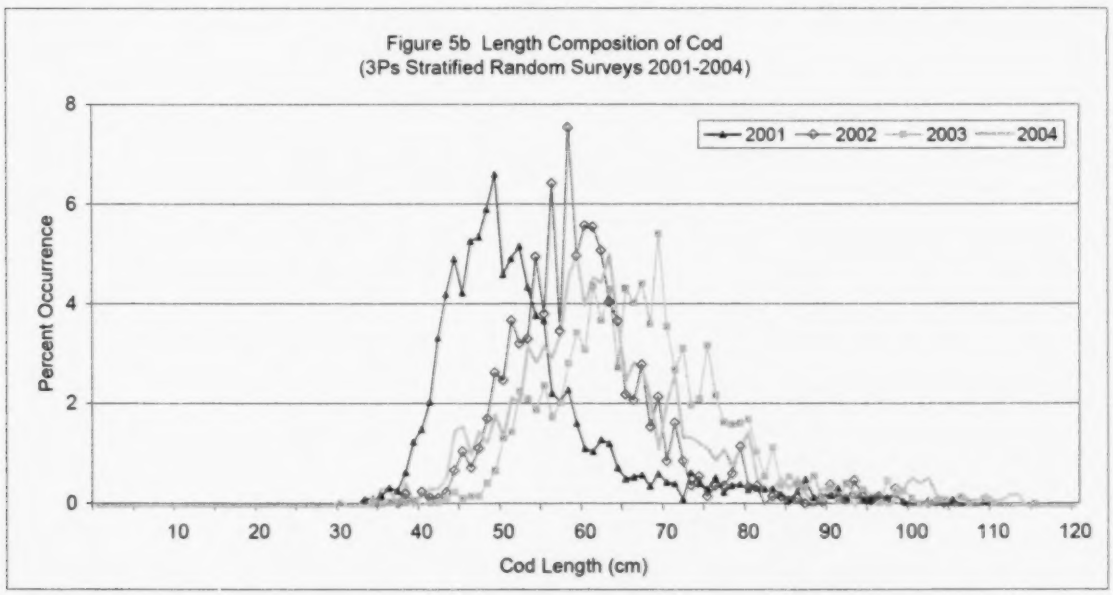


Figure 5b Length Composition of Cod
(3Ps Stratified Random Surveys 2001-2004)
2001
2002
2003
2004
Percent Occurrence
Cod Length (cm)
0
2
4
6
8
10
20
30
40
50
60
70
80
90
100
110
120

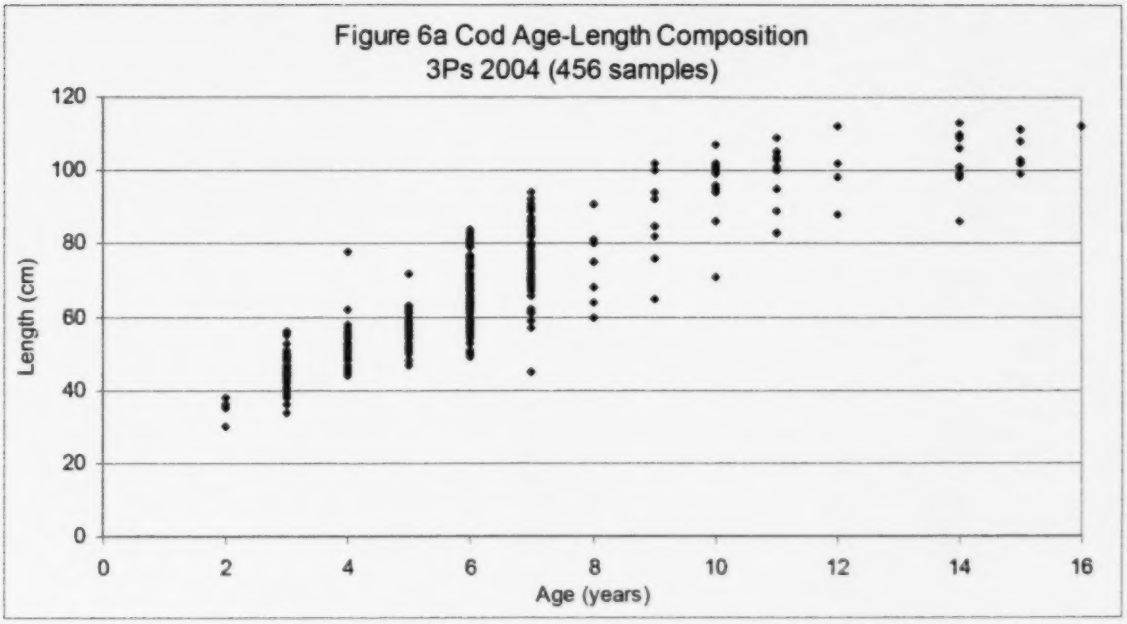


Figure 6a Cod Age-Length Composition
3Ps 2004 (456 samples)
Length (cm)
120
100
80
60
40
20
0
0
2
4
6
8
10
12
14
16
Age (years)

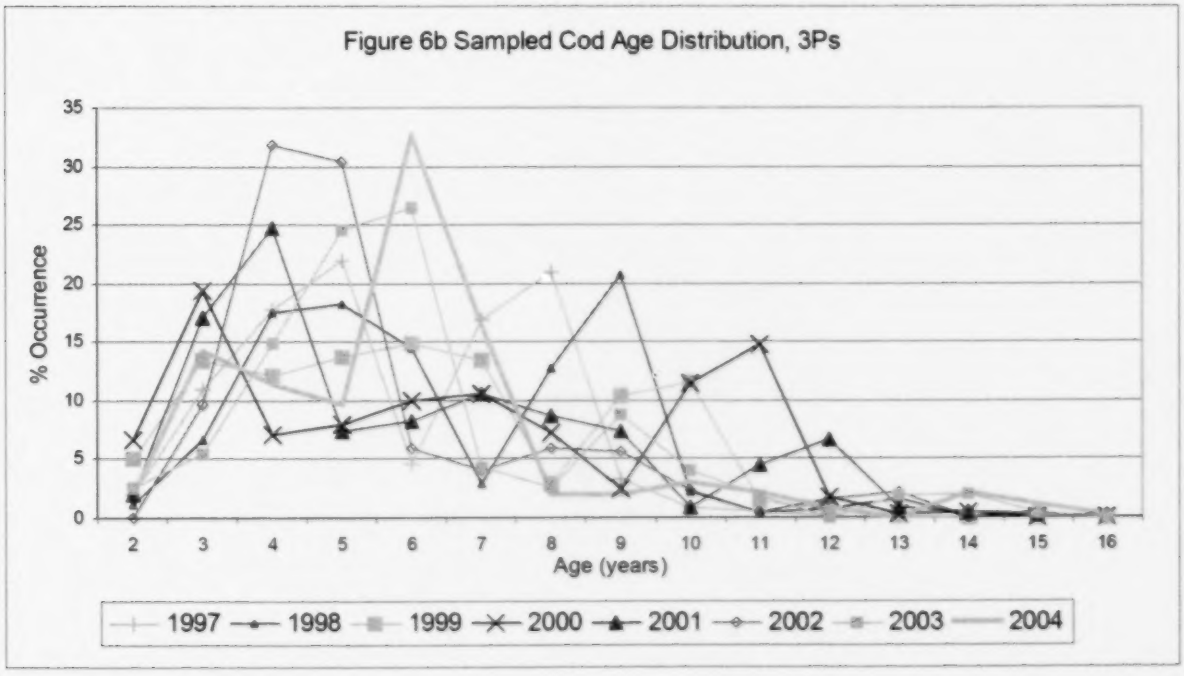


Figure 6b Sampled Cod Age Distribution, 3Ps
% Occurrence
35
30
25
20
15
10
5
0
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Age (years)
1997
1998
1999
2000
2001
2002
2003
2004

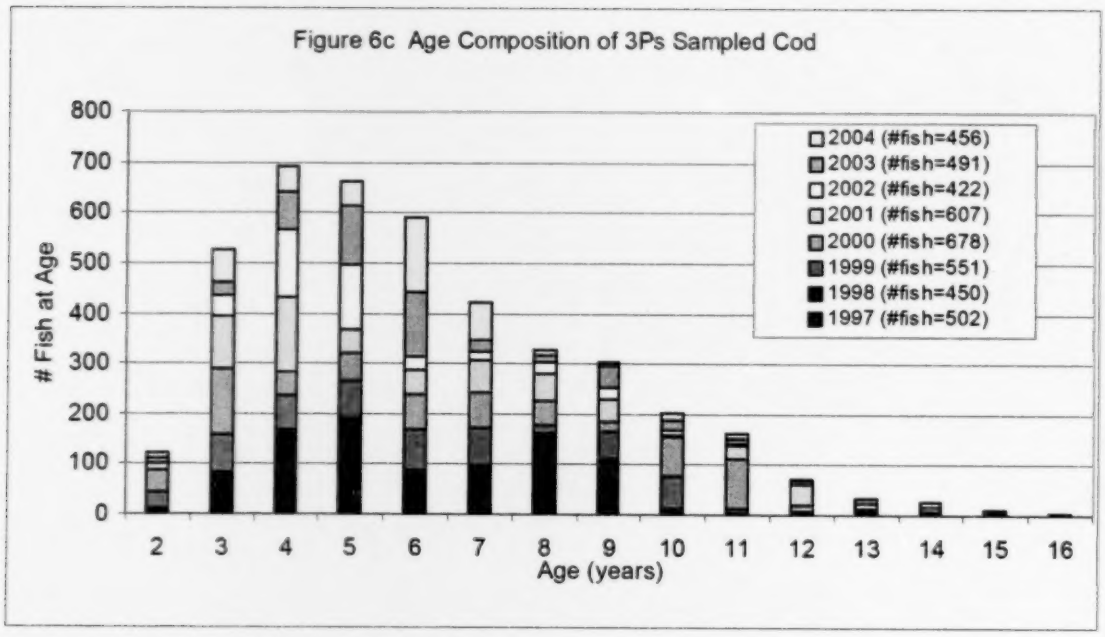


Figure 6c Age Composition of 3Ps Sampled Cod
Fish at Age
Age (years)
2004 (#fish=456)
2003 (#fish=491)
2002 (#fish=422)
2001 (#fish=607)
2000 (#fish=678)
1999 (#fish=551)
1998 (#fish=450)
1997 (#fish=502)

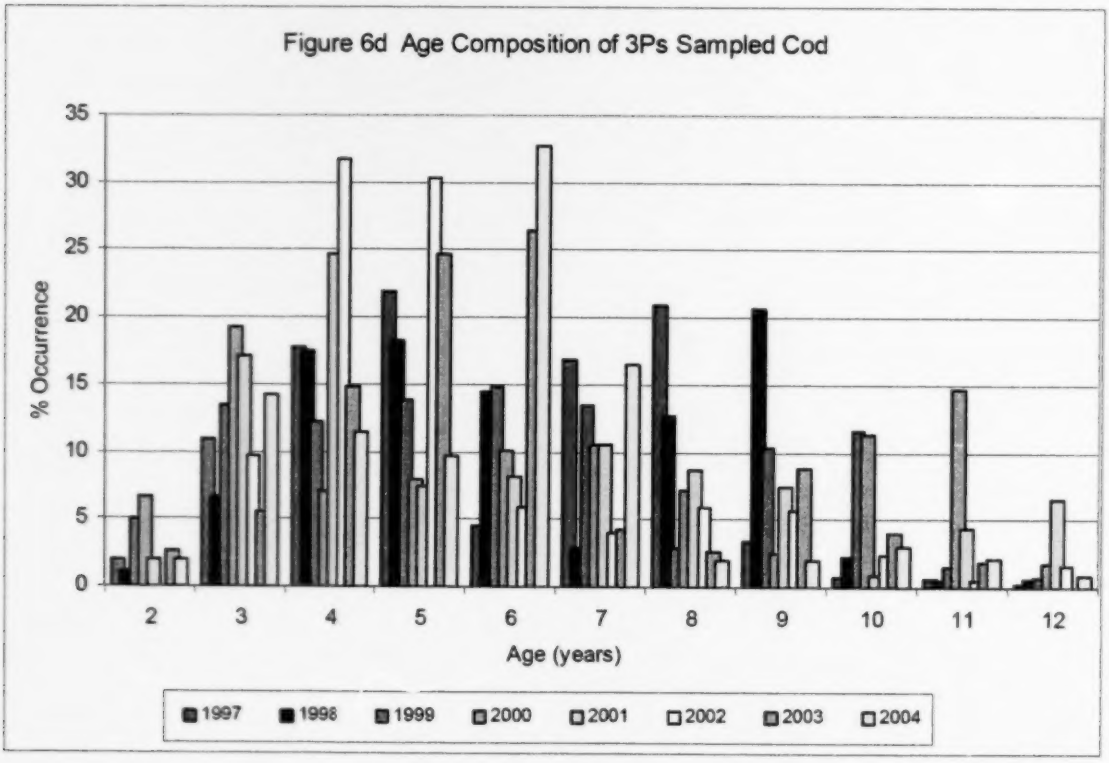


Figure 6d Age Composition of 3Ps Sampled Cod
% Occurrence
Age (years)
1997
1998
1999
2000
2001
2002
2003
2004

Figure 7 Cod, 3Ps, 1997-2004, Estimated Age Composition

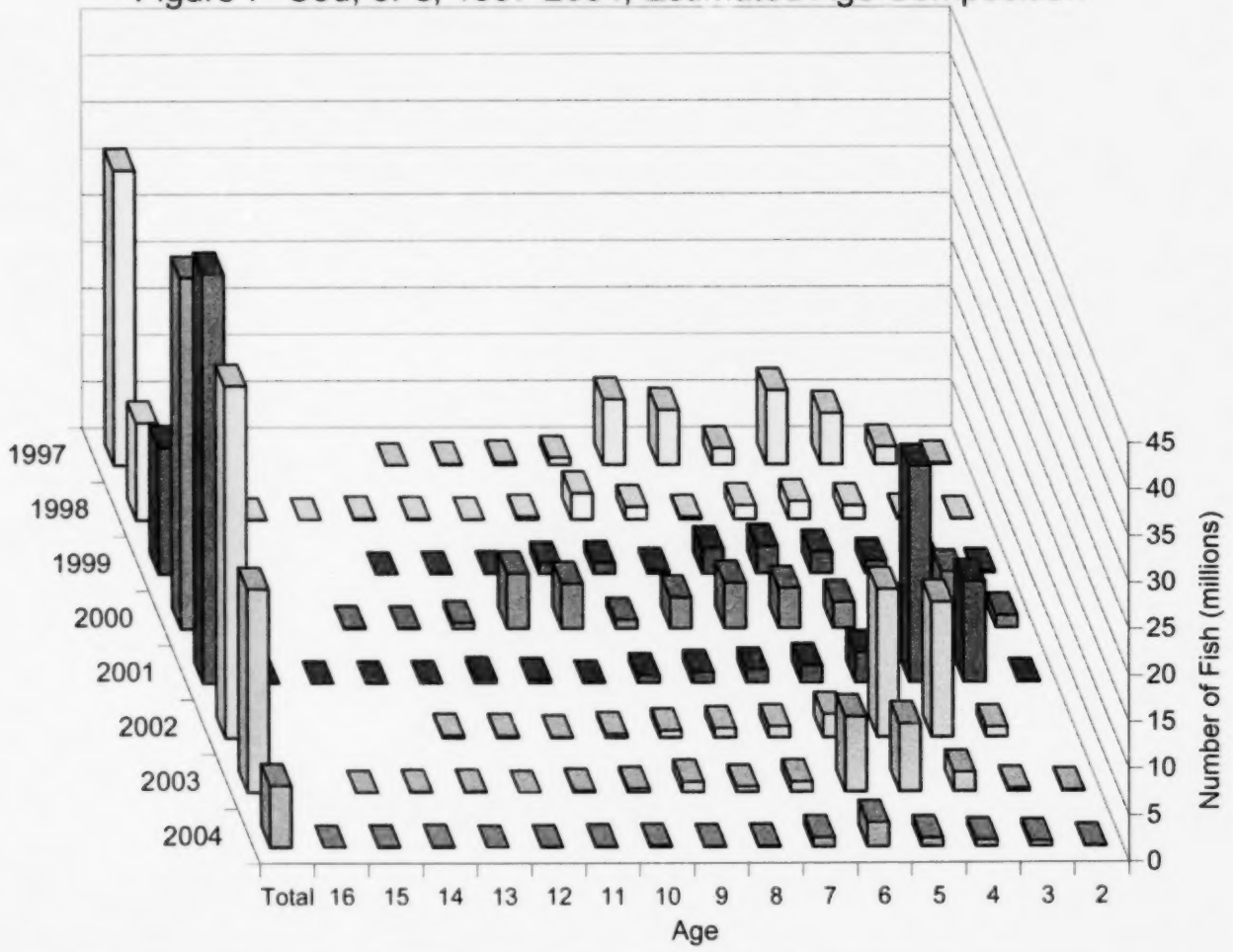
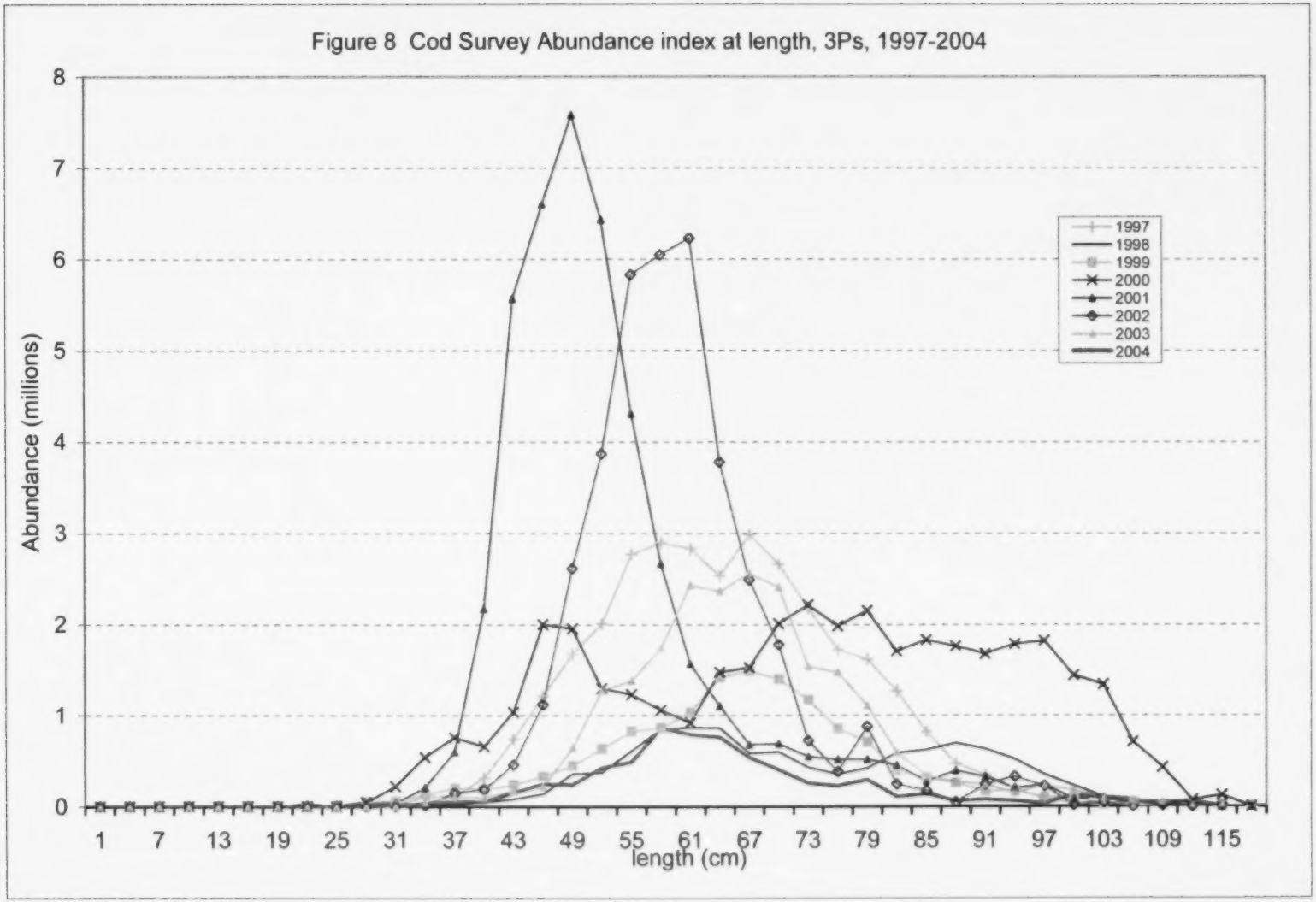


Figure 8 Cod Survey Abundance index at length, 3Ps, 1997-2004



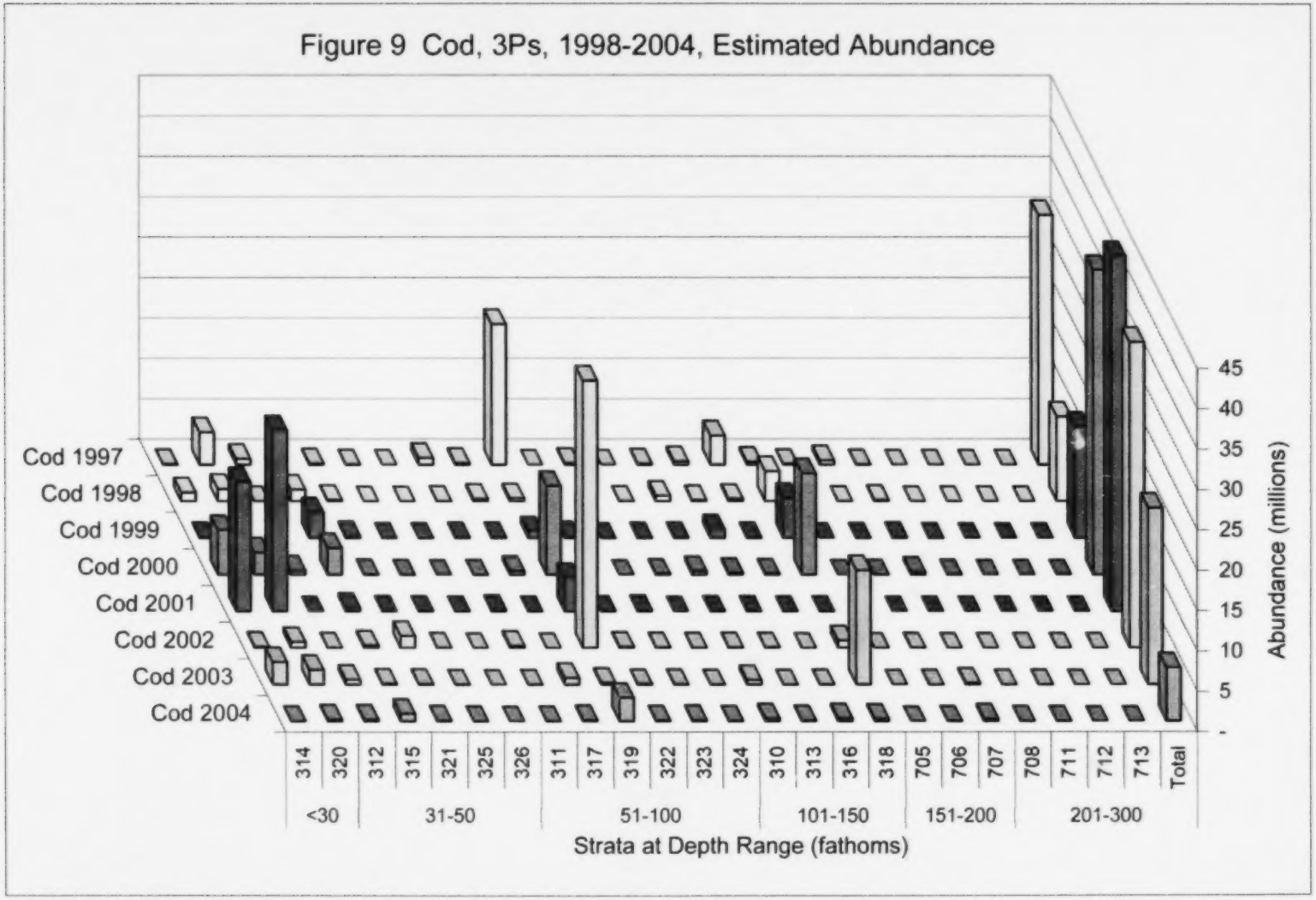


Figure 9 Cod, 3Ps, 1998-2004, Estimated Abundance
Cod 1997
Cod 1998
Cod 1999
Cod 2000
Cod 2001
Cod 2002
Cod 2003
Cod 2004
45
40
35
30
25
20
15
10
5
-
Abundance (millions)
314
320
312
315
321
325
326
311
317
319
322
323
324
310
313
316
318
705
706
707
708
711
712
713
Total
<30
31-50
51-100
101-150
151-200
201-300
Strata at Depth Range (fathoms)

Figure 10 Cod, 3Ps, 1998-2004, Estimated Biomass

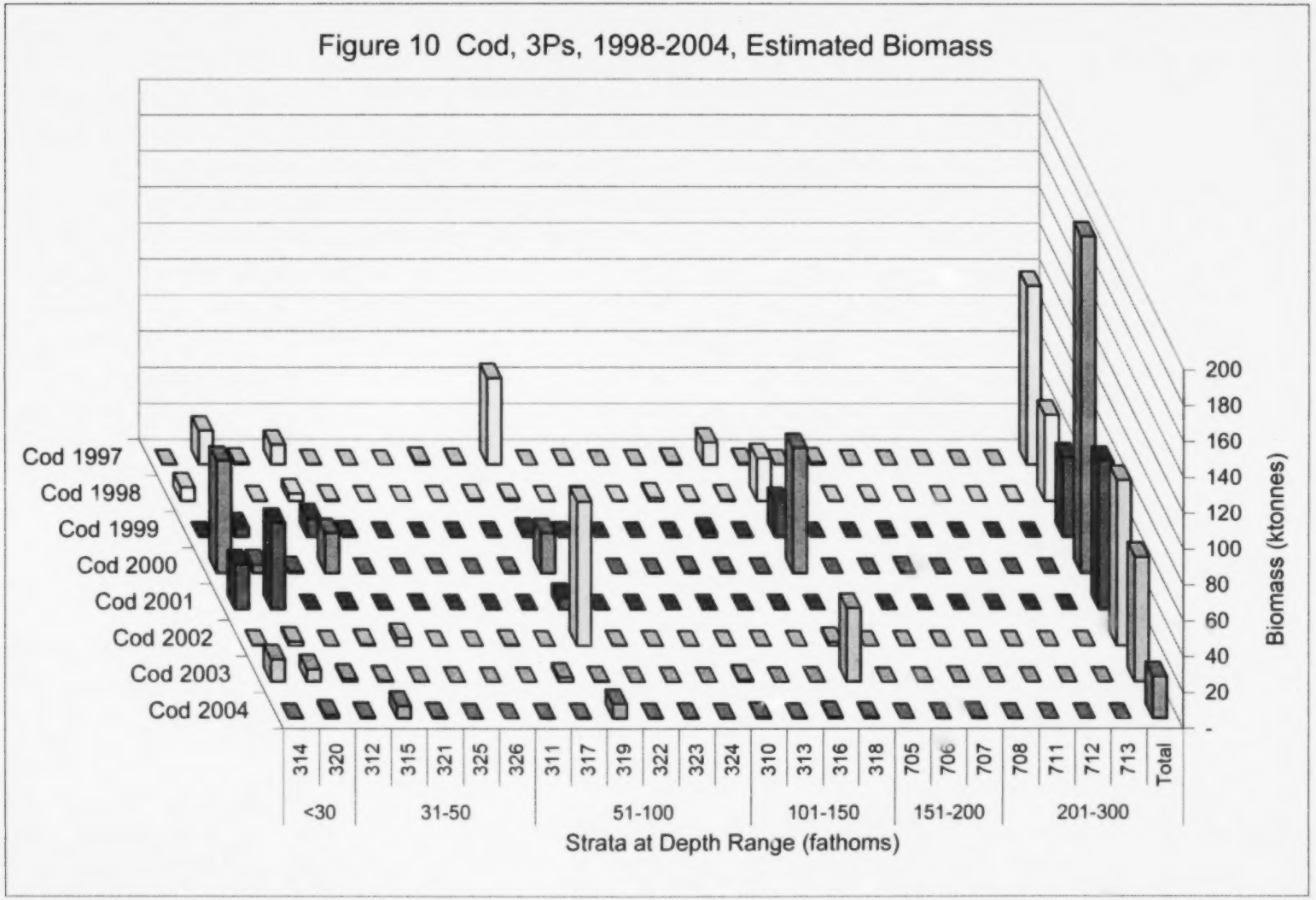
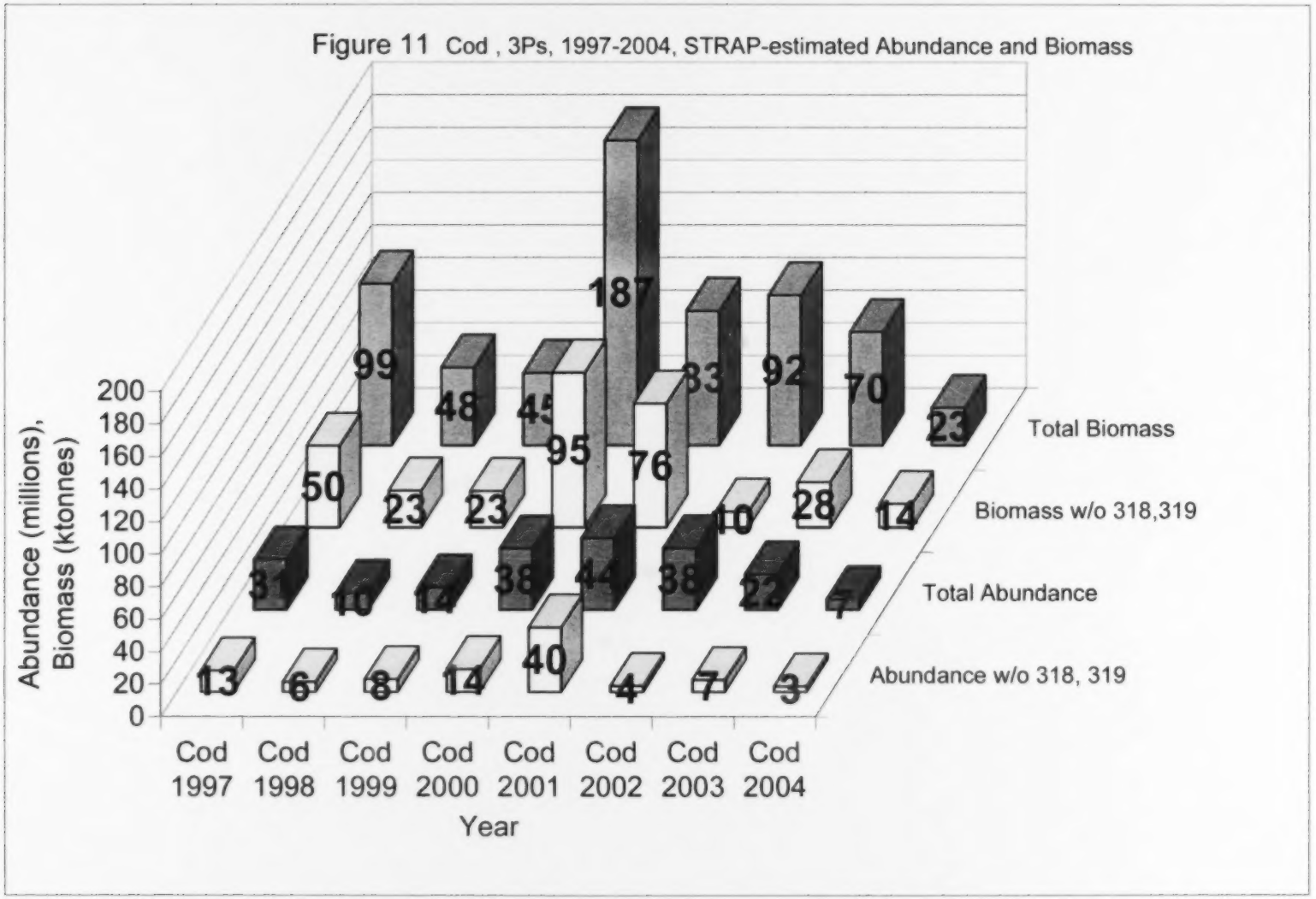


Figure 11 Cod , 3Ps, 1997-2004, STRAP-estimated Abundance and Biomass



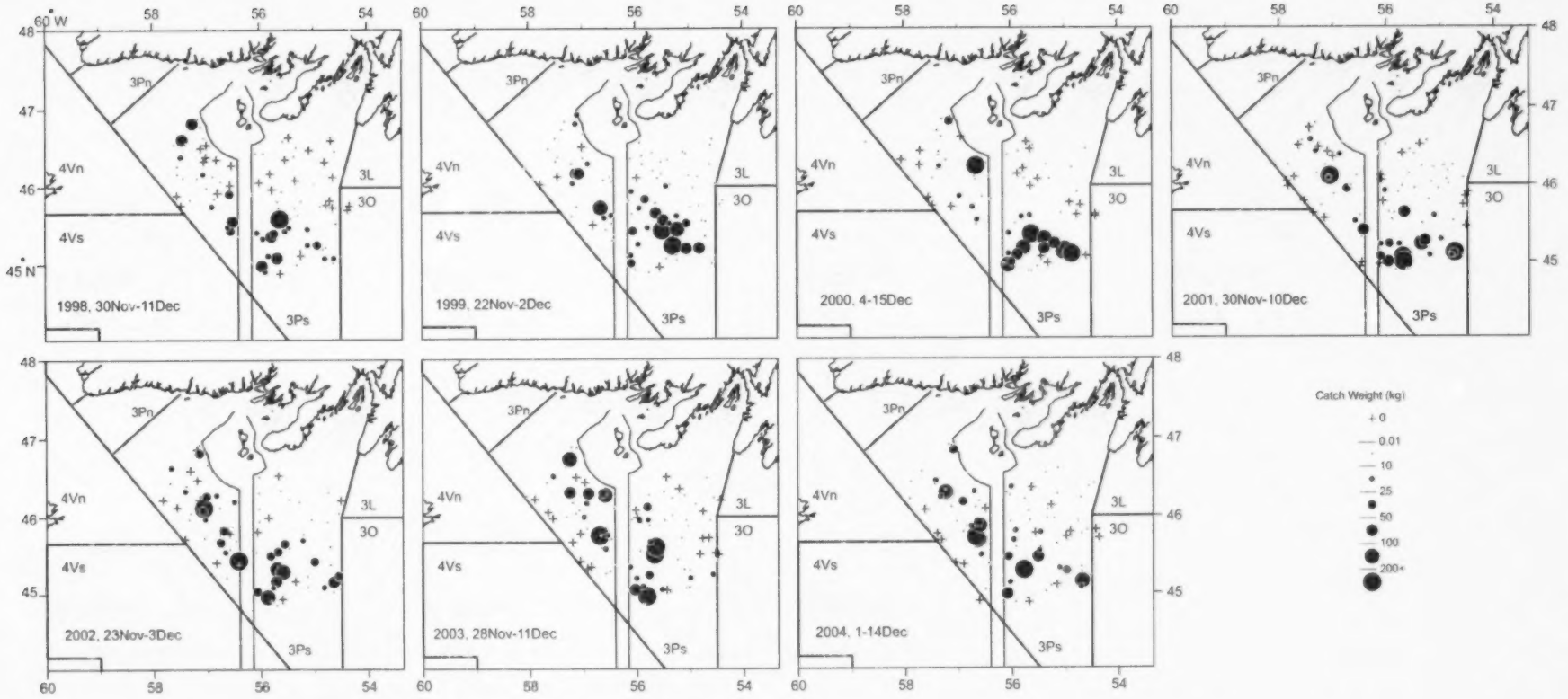


Figure 12 American Plaice Catch Weight Distribution from GEAC Stratified Random Surveys, 3Ps, 1998-2004. 200, 400, and 800 m depth contours are shown.

Figure 13a GEAC Fall 3Ps Surveys

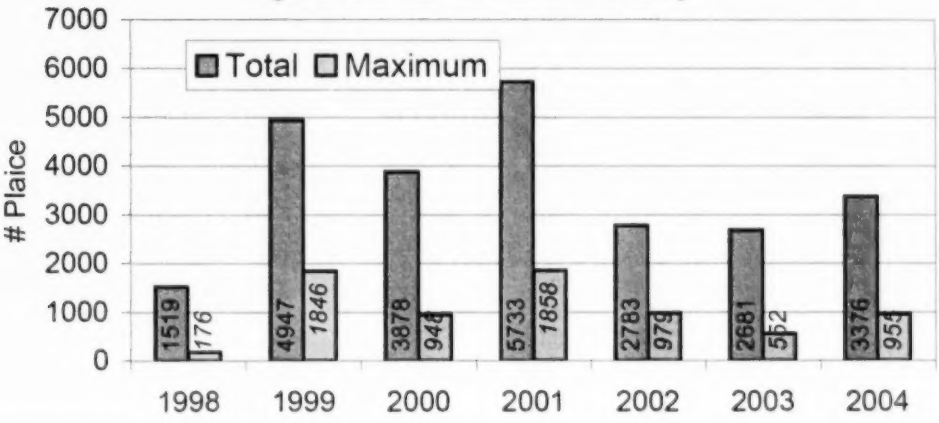


Figure 13b GEAC Fall 3Ps Surveys

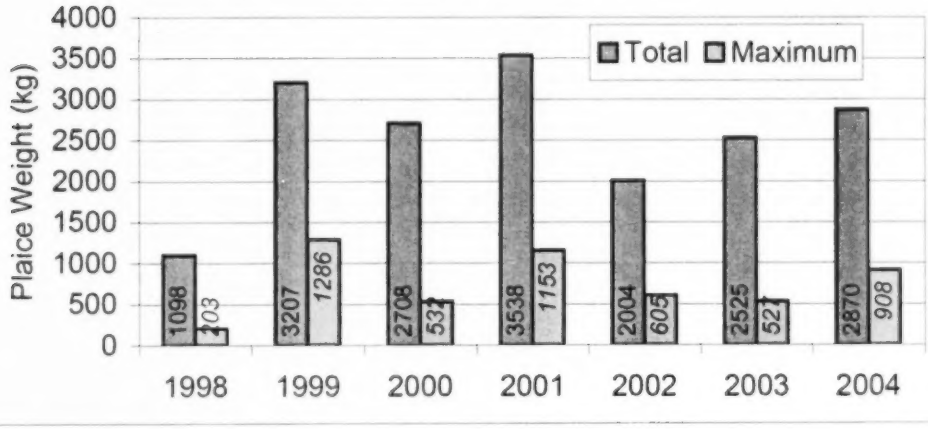


Figure 13c GEAC Fall 3Ps Surveys: Largest Sets

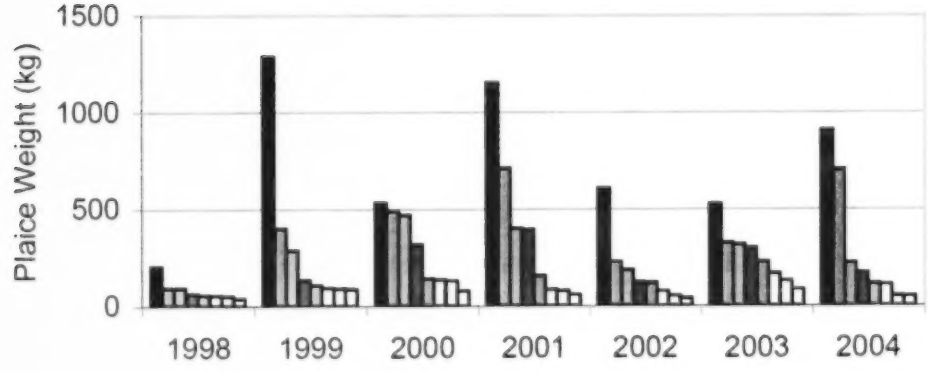


Figure 14a Length Composition of Plaice
(3Ps Stratified Random Surveys 1998-2000,2004)

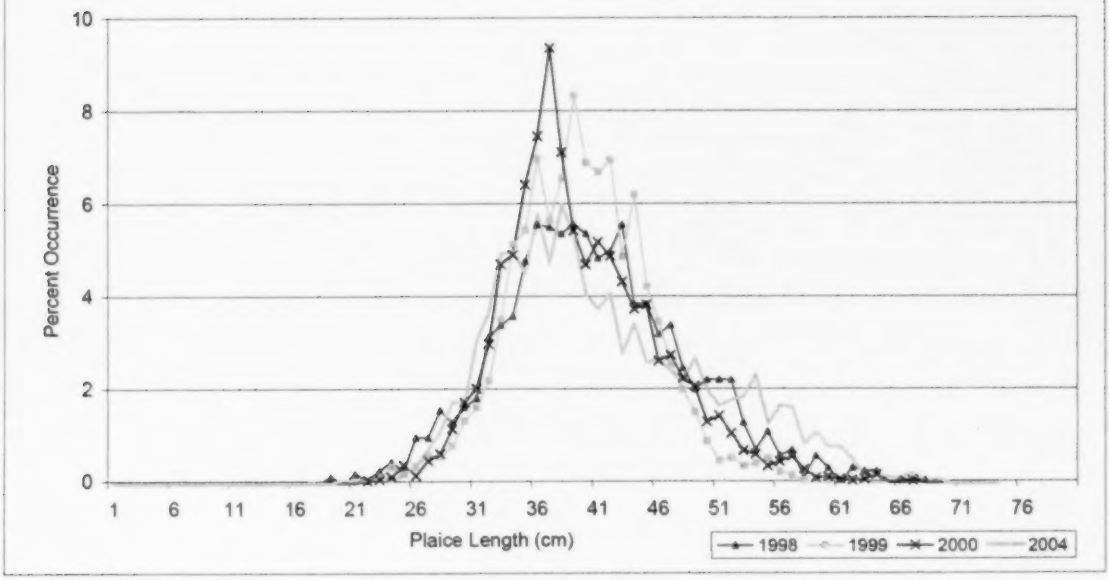
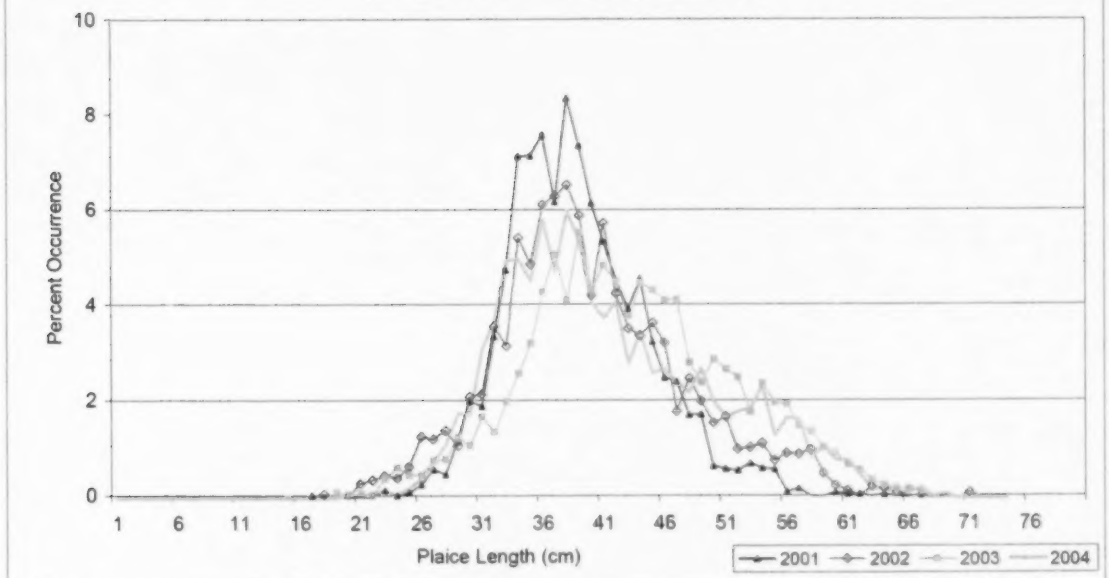


Figure 14b Length Composition of Plaice
(3Ps Stratified Random Surveys 2001-2004)



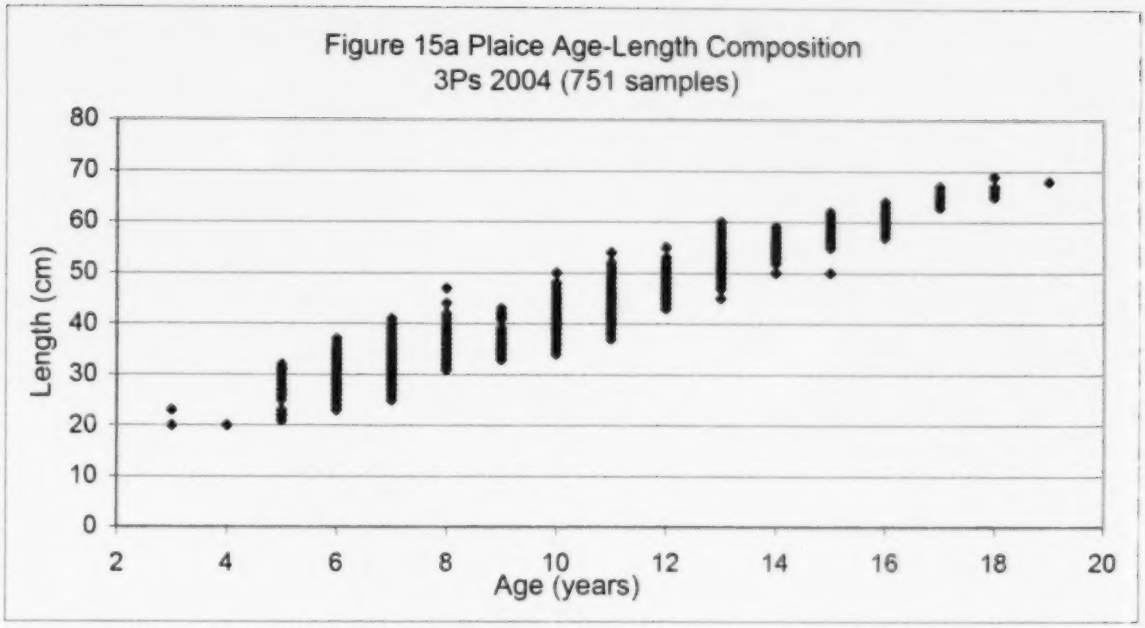


Figure 15a Plaice Age-Length Composition
3Ps 2004 (751 samples)
Length (cm)
Age (years)
0
10
20
30
40
50
60
70
80
2
4
6
8
10
12
14
16
18
20

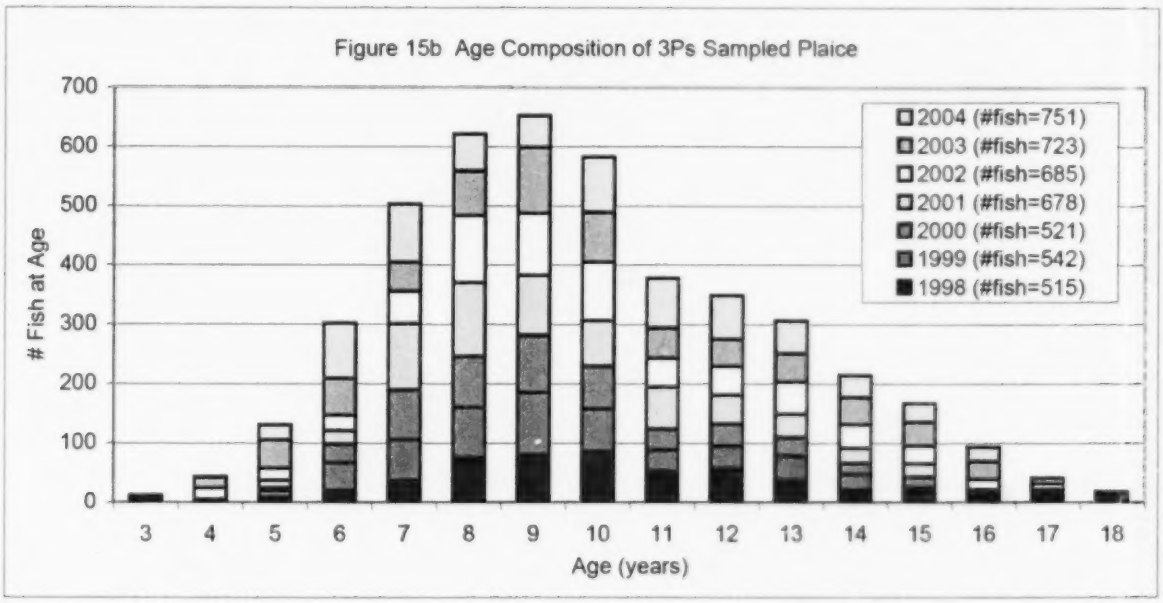


Figure 15b Age Composition of 3Ps Sampled Plaice
Fish at Age
Age (years)
2004 (#fish=751)
2003 (#fish=723)
2002 (#fish=685)
2001 (#fish=678)
2000 (#fish=521)
1999 (#fish=542)
1998 (#fish=515)
0
100
200
300
400
500
600
700
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

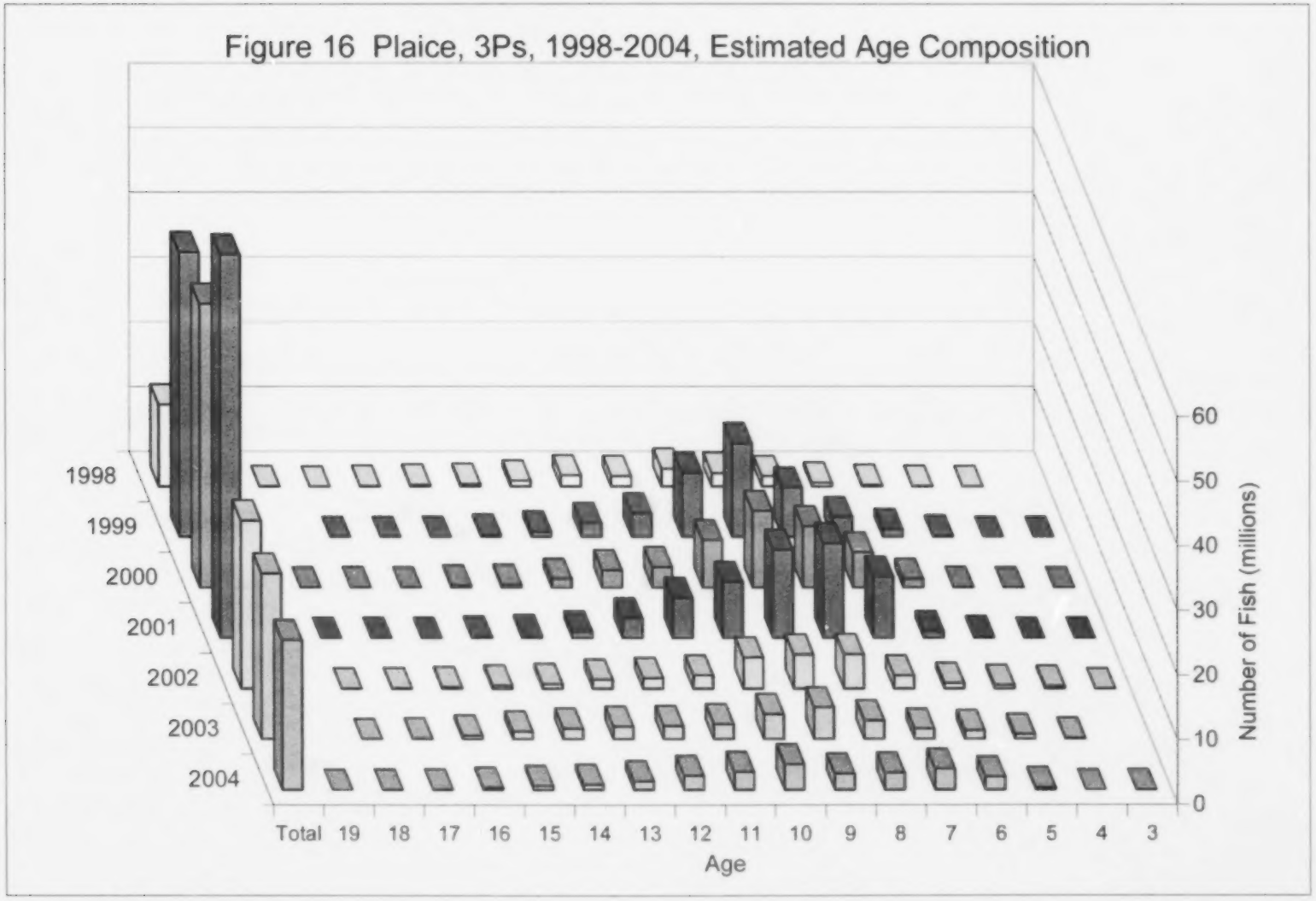


Figure 16 Plaice, 3Ps, 1998-2004, Estimated Age Composition
1998
1999
2000
2001
2002
2003
2004
Total 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3
Age
0 10 20 30 40 50 60
Number of Fish (millions)

Figure 17 Plaice Survey Abundance index at length, 3Ps, 1998-2004

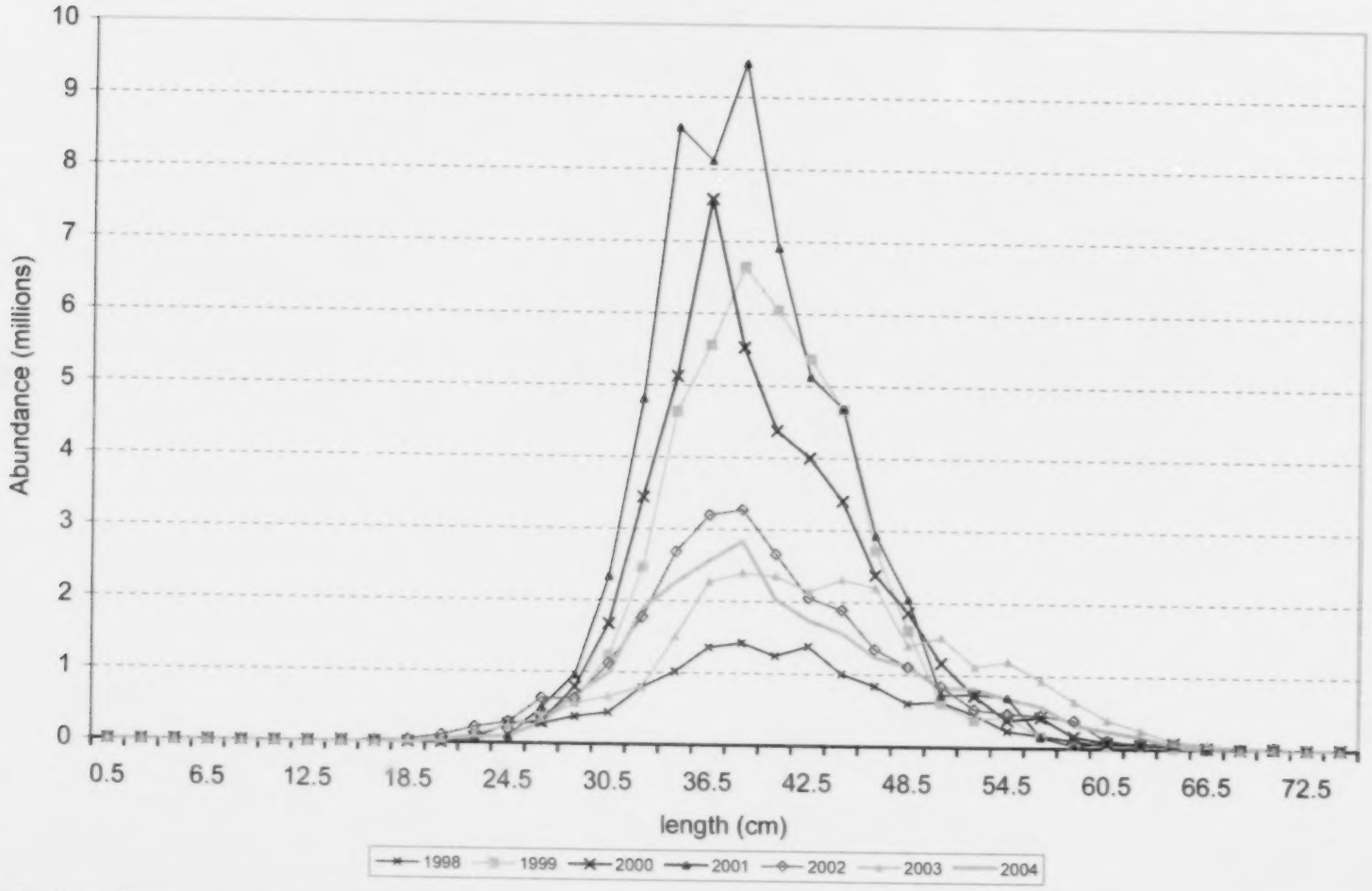


Figure 18 Plaice, 3Ps, 1998-2004, Estimated Abundance

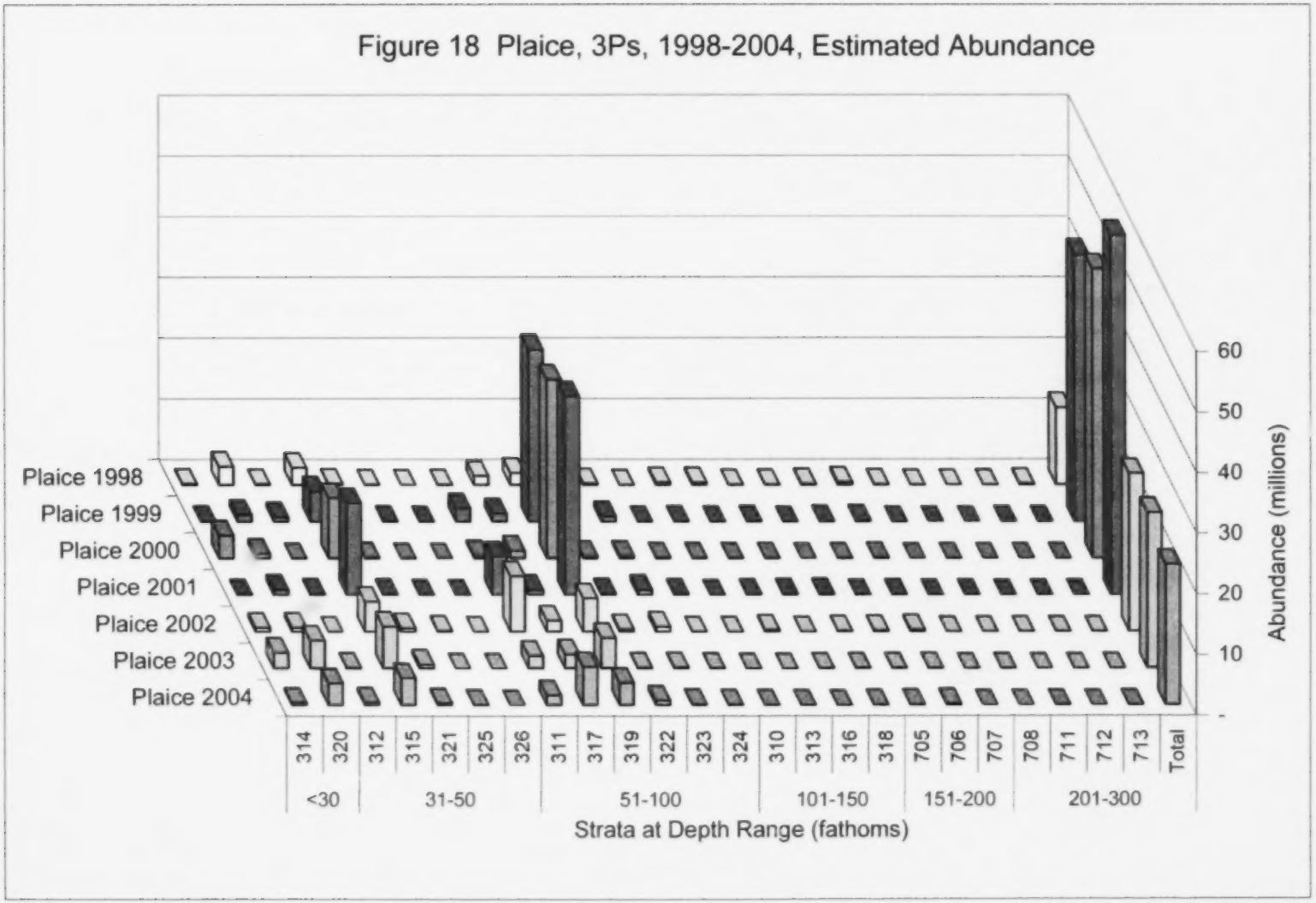
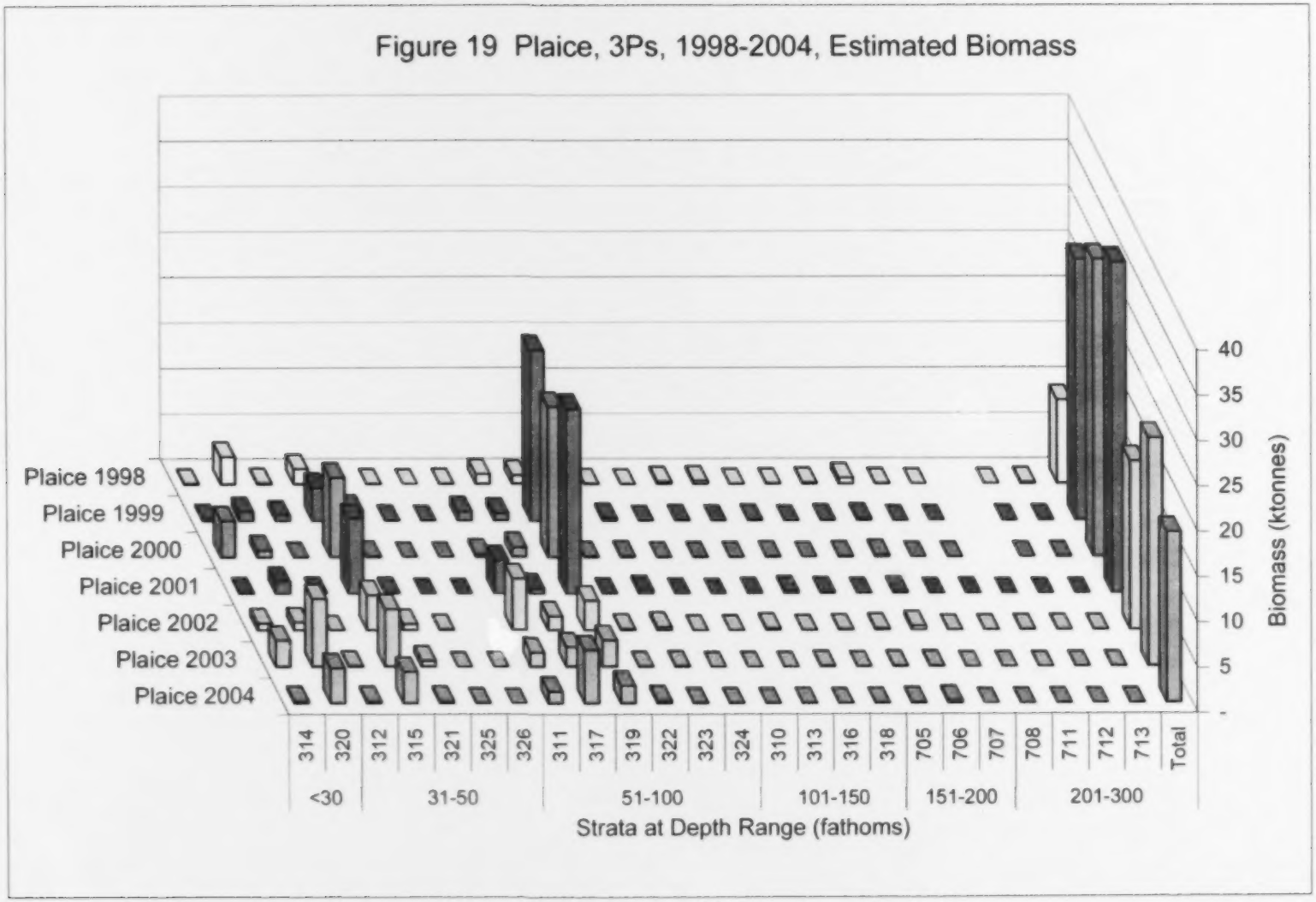


Figure 19 Plaice, 3Ps, 1998-2004, Estimated Biomass



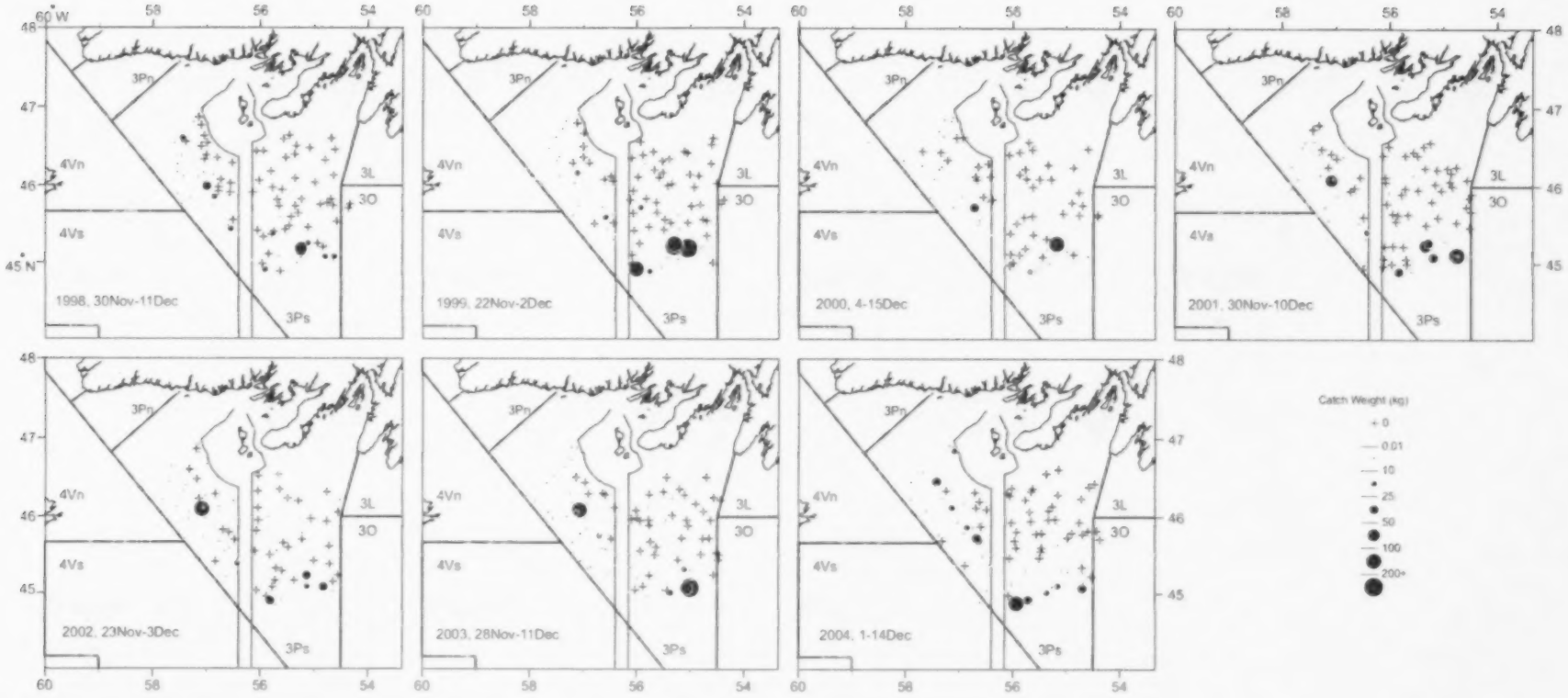


Figure 20 Witch Catch Weight Distribution from GEAC Stratified Random Surveys, 3Ps, 1998-2004. 200, 400, and 800 m depth contours are shown.

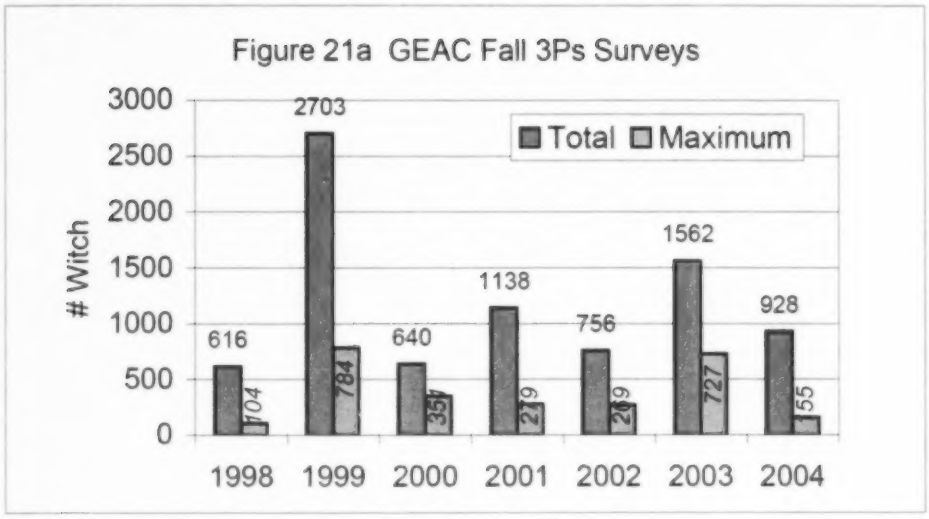


Figure 21a GEAC Fall 3Ps Surveys
Witch
Total
Maximum
3000
2500
2000
1500
1000
500
0
616
104
2703
784
640
351
1138
219
756
269
1562
727
928
155
1998
1999
2000
2001
2002
2003
2004

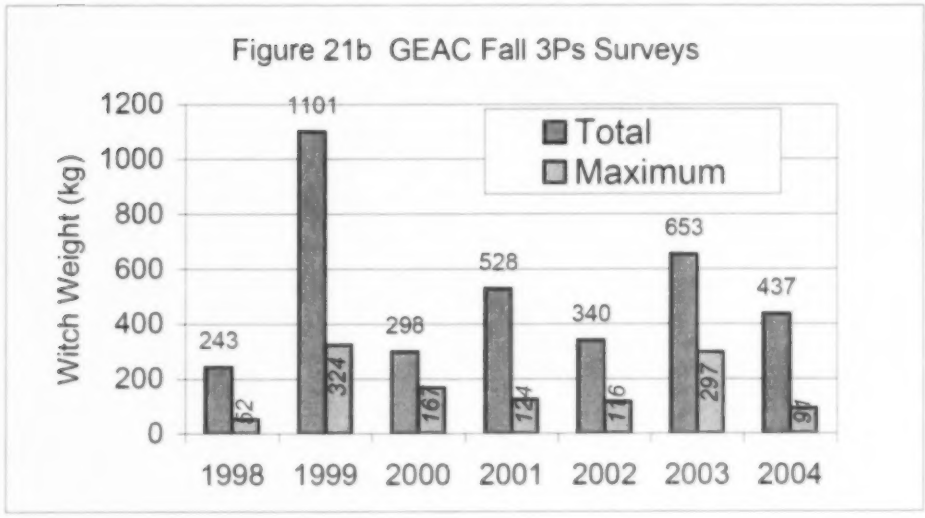


Figure 21b GEAC Fall 3Ps Surveys
Witch Weight (kg)
Total
Maximum
1200
1000
800
600
400
200
0
243
52
1101
324
298
161
528
124
340
116
653
297
437
91
1998
1999
2000
2001
2002
2003
2004

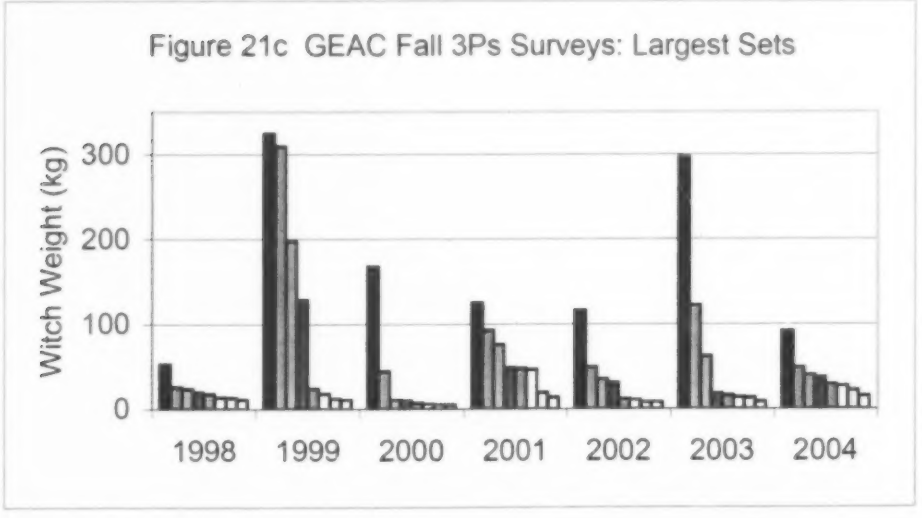


Figure 21c GEAC Fall 3Ps Surveys: Largest Sets
Witch Weight (kg)
300
200
100
0
1998
1999
2000
2001
2002
2003
2004

Figure 22a Length Composition of Witch
(3Ps Stratified Random Surveys 1998-2000,2004)

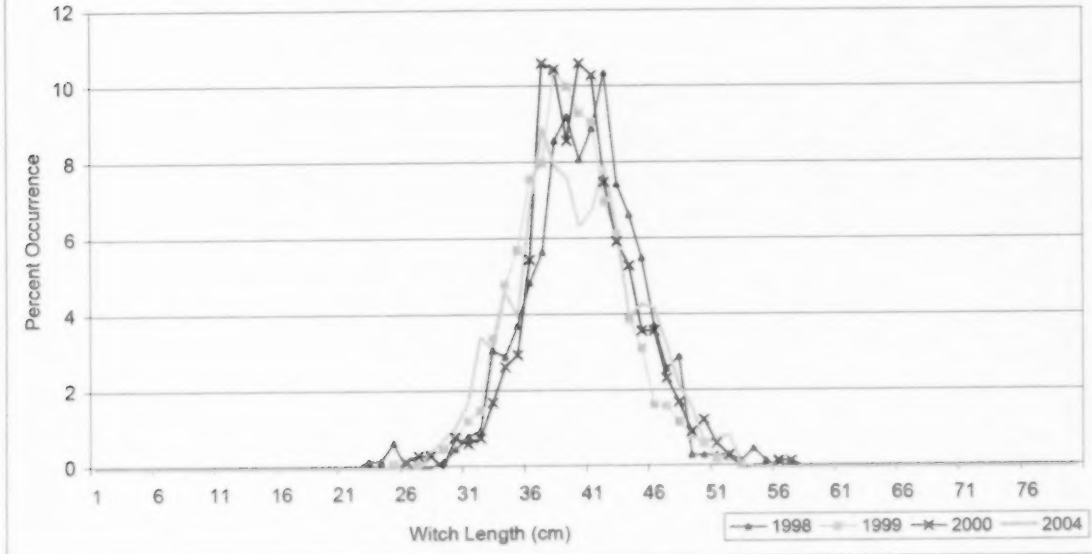
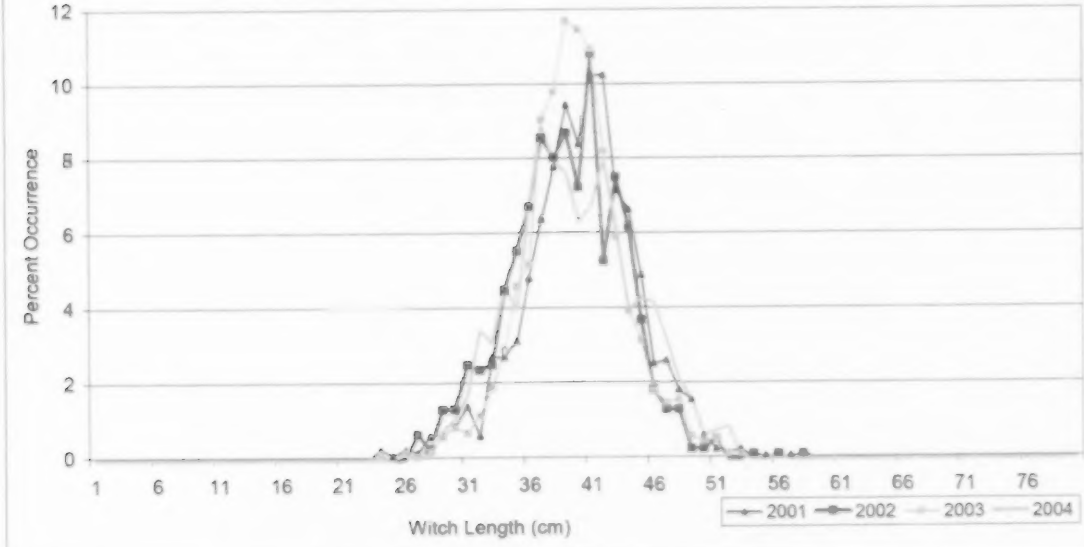


Figure 22b Length Composition of Witch
(3Ps Stratified Random Surveys 2001-2004)



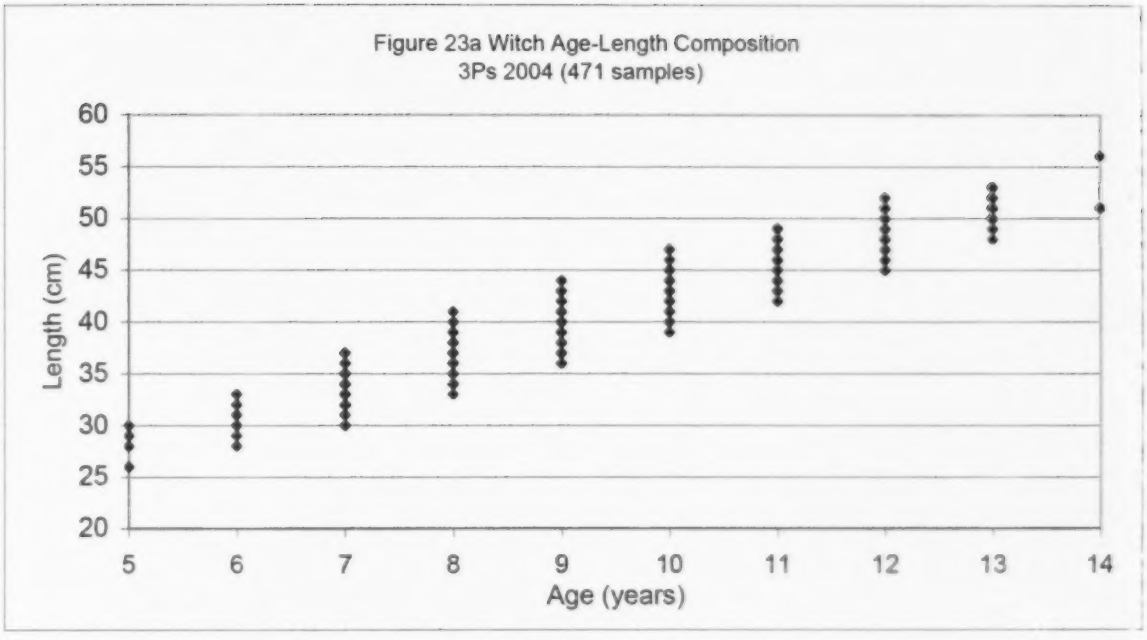


Figure 23a Witch Age-Length Composition
3Ps 2004 (471 samples)
Length (cm)
60
55
50
45
40
35
30
25
20
5
6
7
8
9
10
11
12
13
14
Age (years)

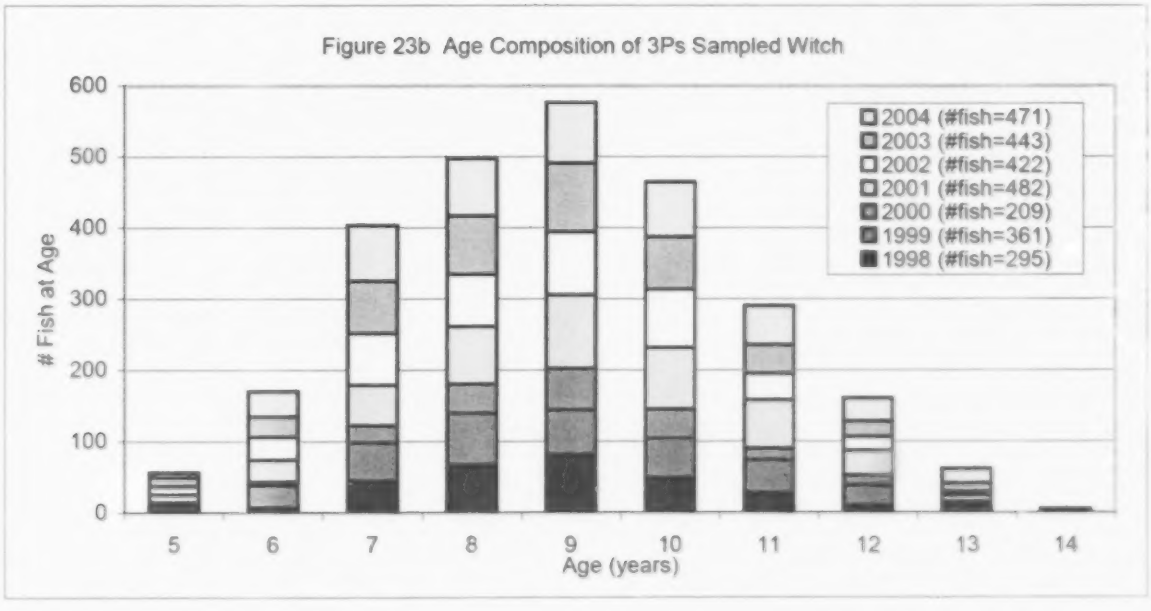


Figure 23b Age Composition of 3Ps Sampled Witch
Fish at Age
600
500
400
300
200
100
0
5
6
7
8
9
10
11
12
13
14
Age (years)
2004 (#fish=471)
2003 (#fish=443)
2002 (#fish=422)
2001 (#fish=482)
2000 (#fish=209)
1999 (#fish=361)
1998 (#fish=295)

Figure 24 Witch, 3Ps, 1998-2004, Estimated Age Composition

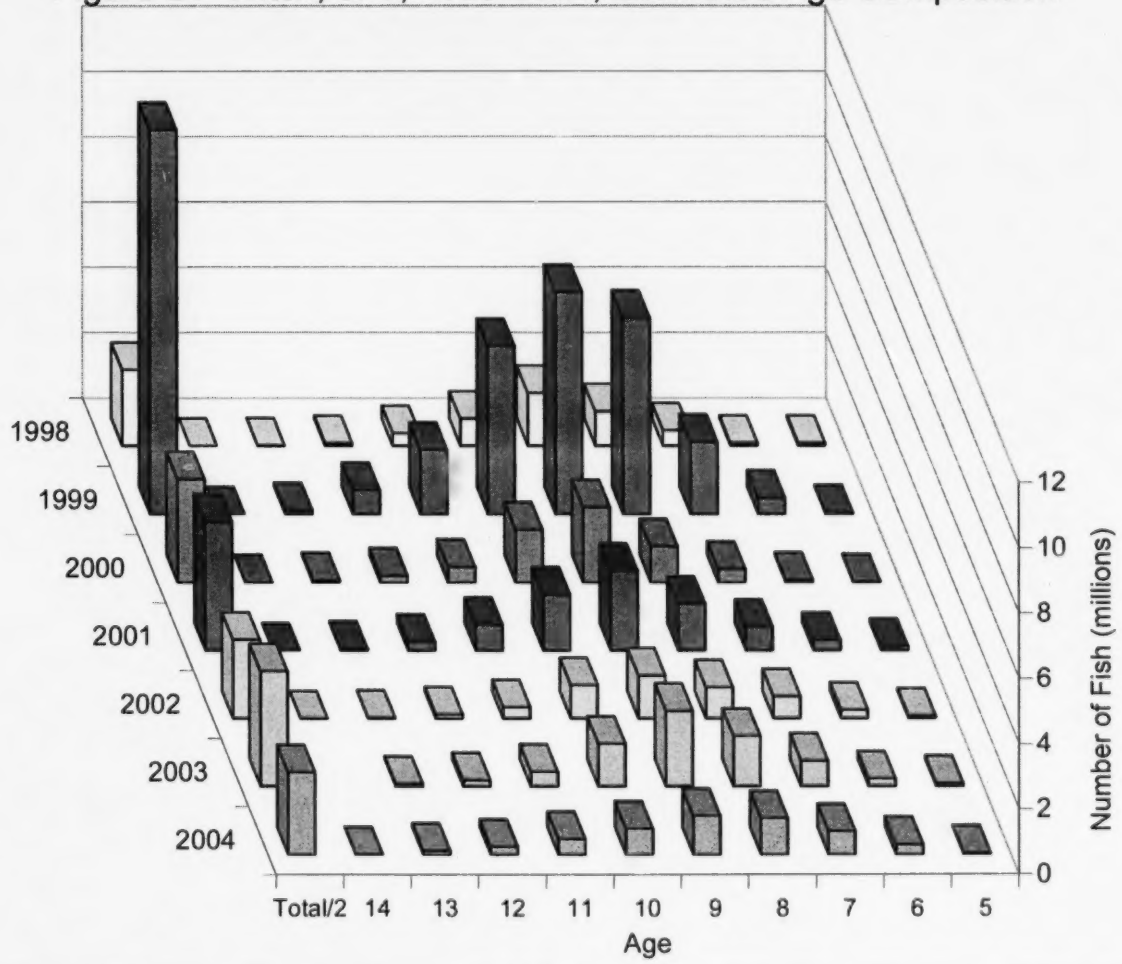


Figure 25 Witch Survey Abundance index at length, 3Ps, 1998-2004

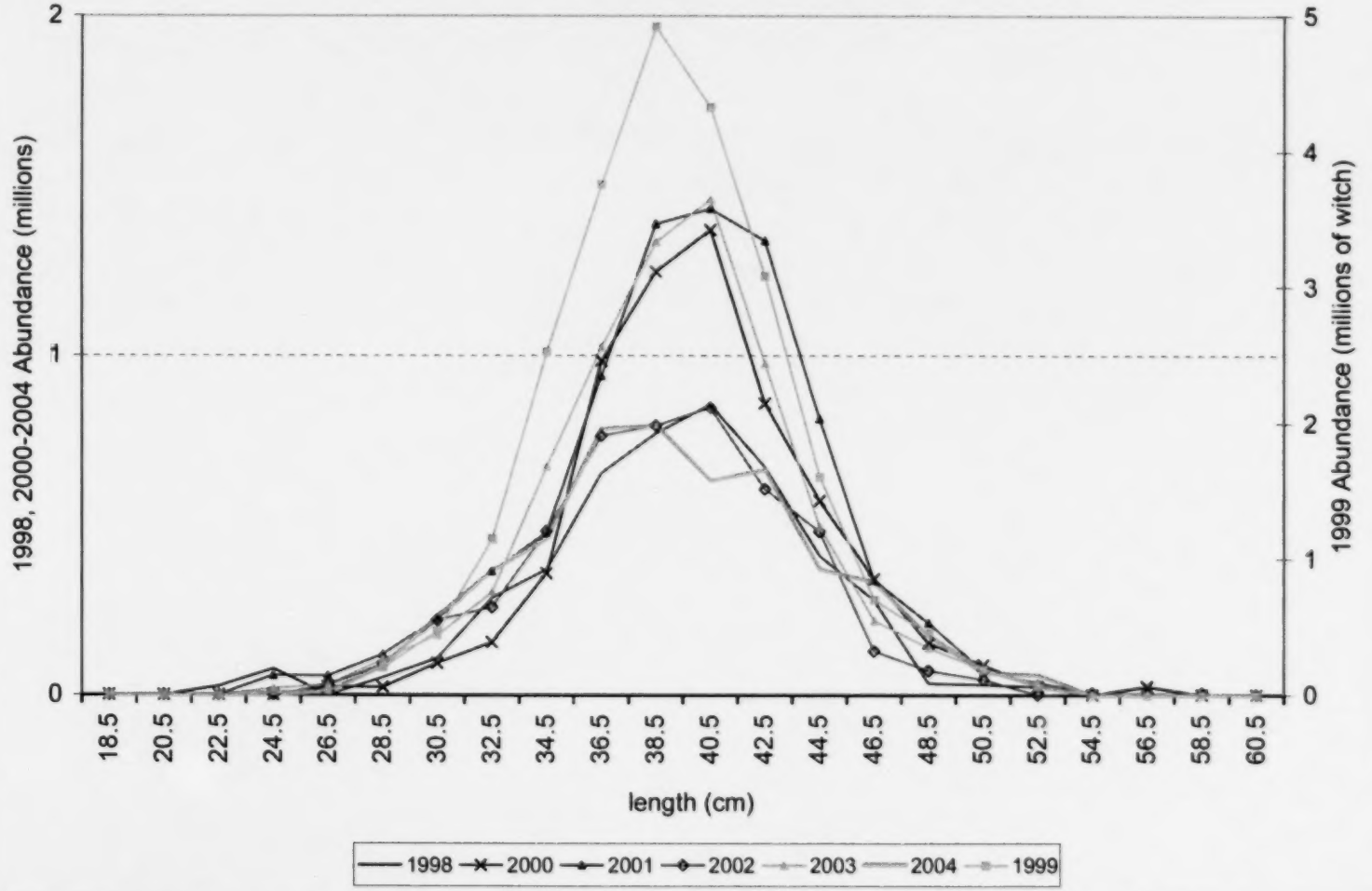


Figure 26 Witch, 3Ps, 1998-2004, Estimated Abundance

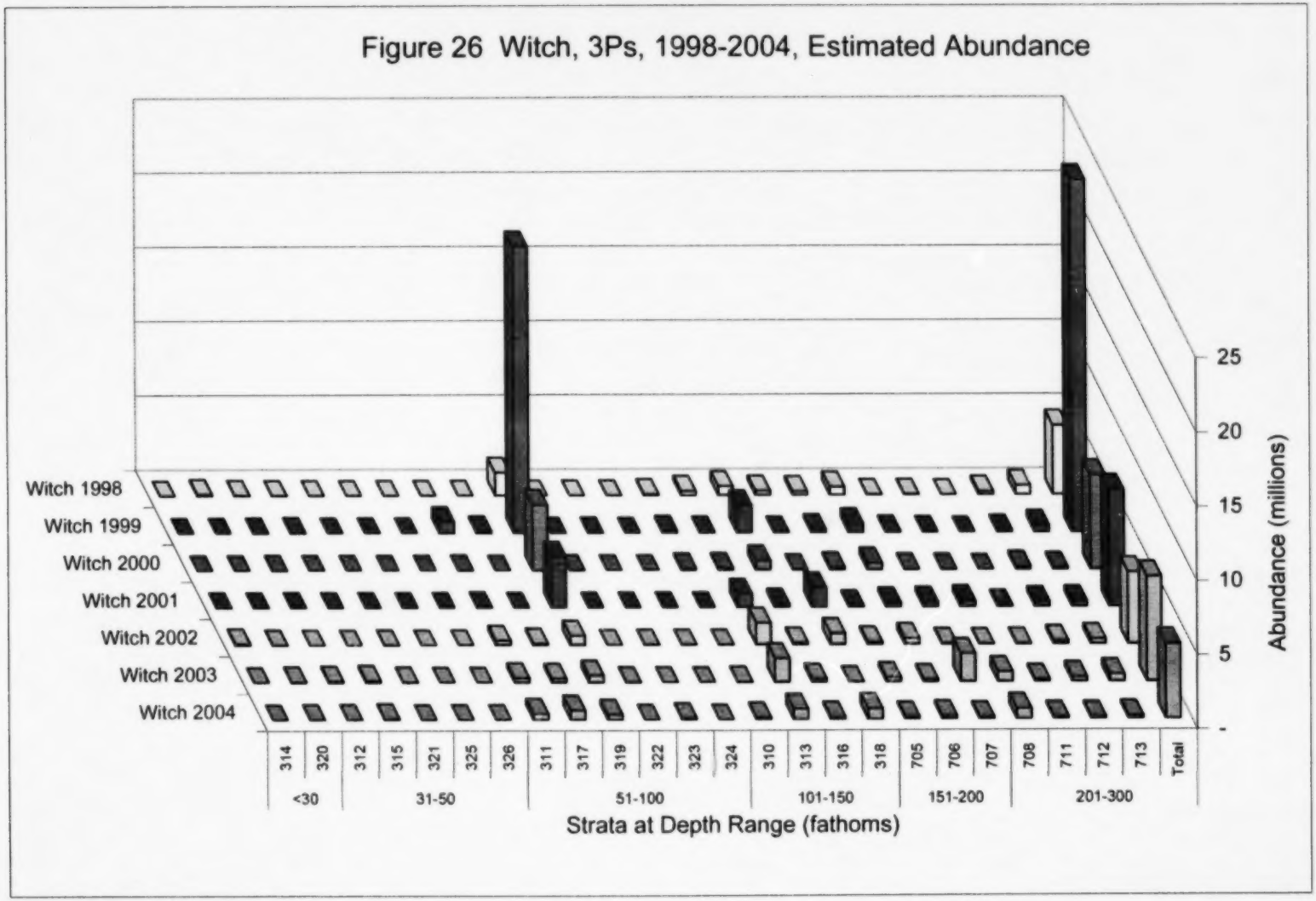
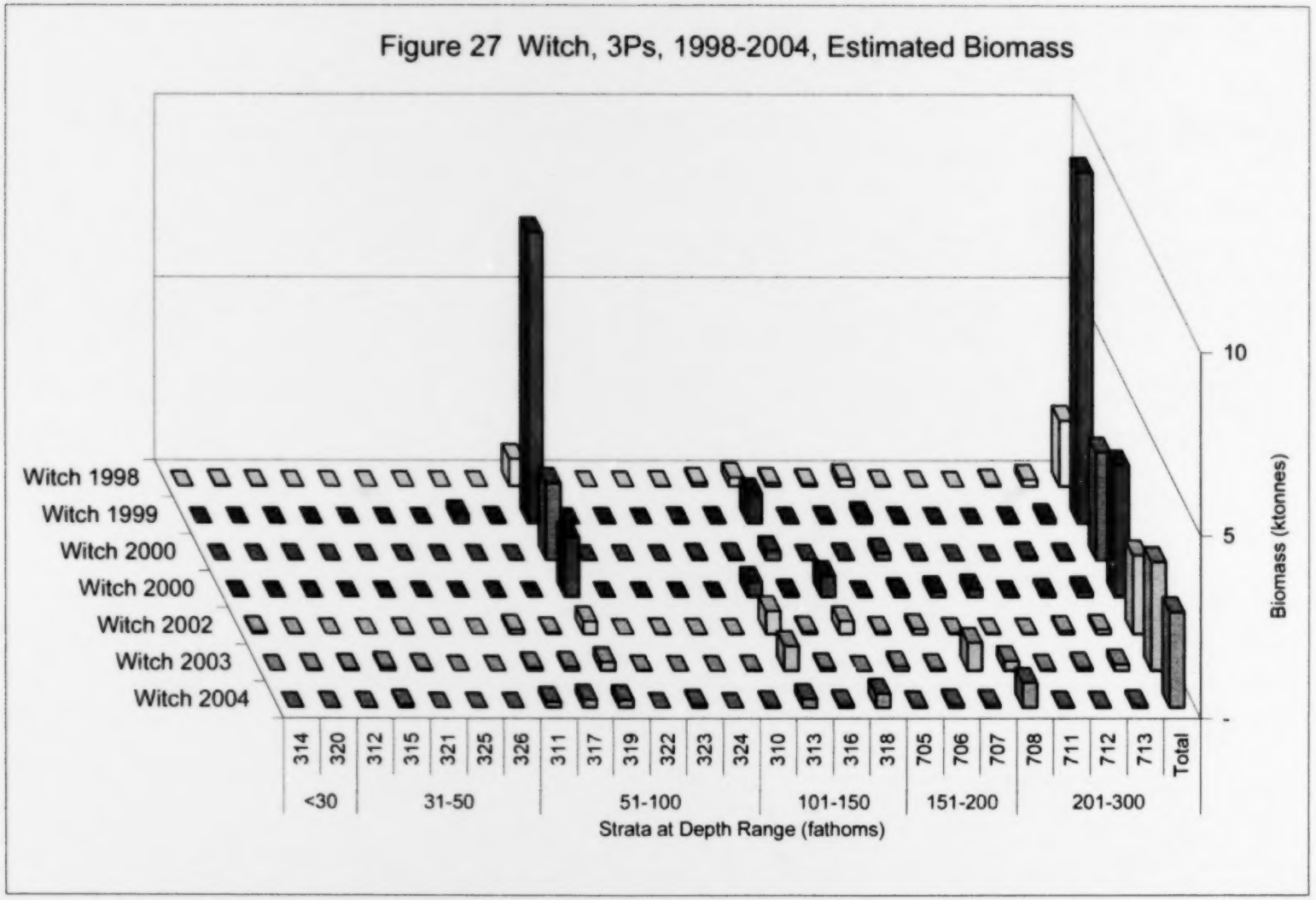


Figure 27 Witch, 3Ps, 1998-2004, Estimated Biomass



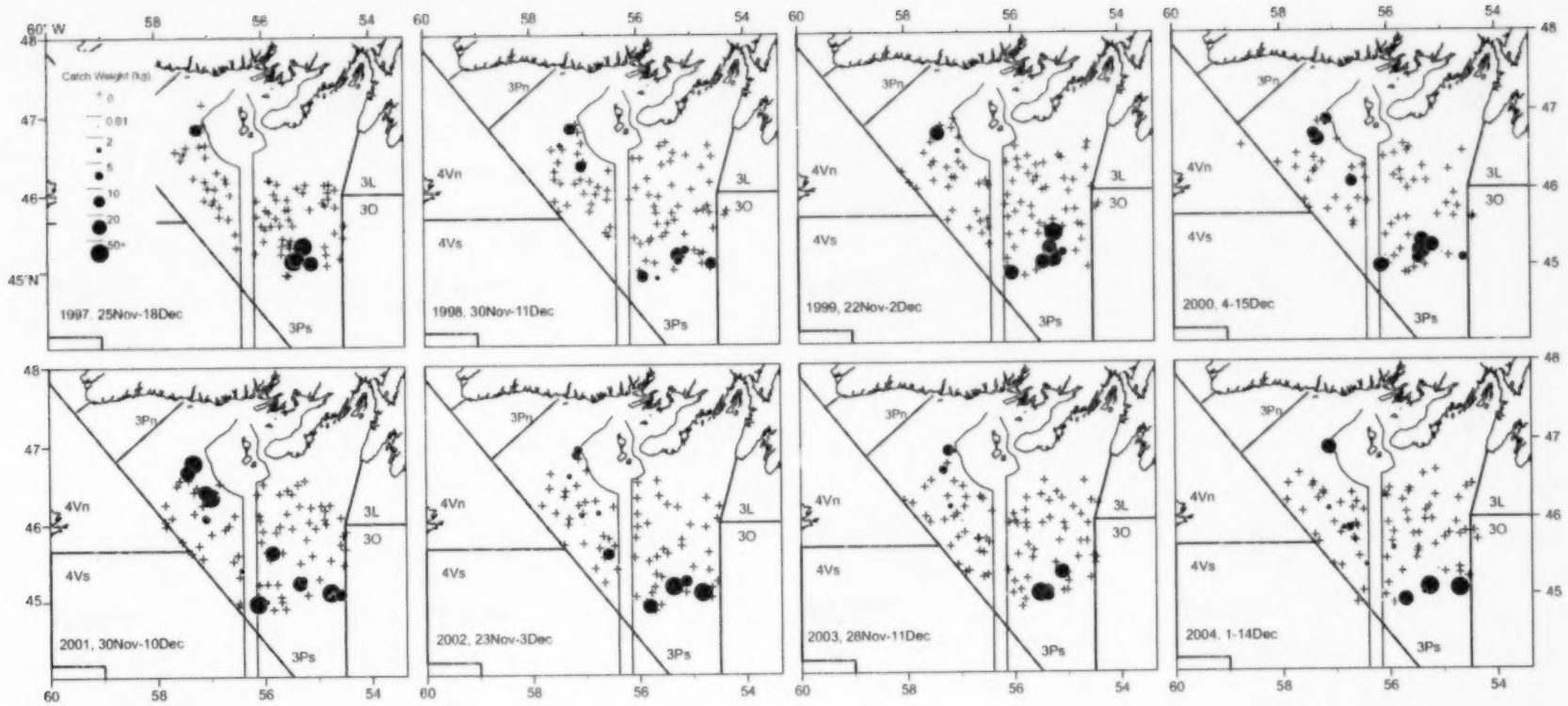


Figure 28a Haddock Catch Weight Distribution from GEAC Stratified Random Surveys. 3Ps, 1997-2004.
200, 400, and 800 m depth contours are shown.

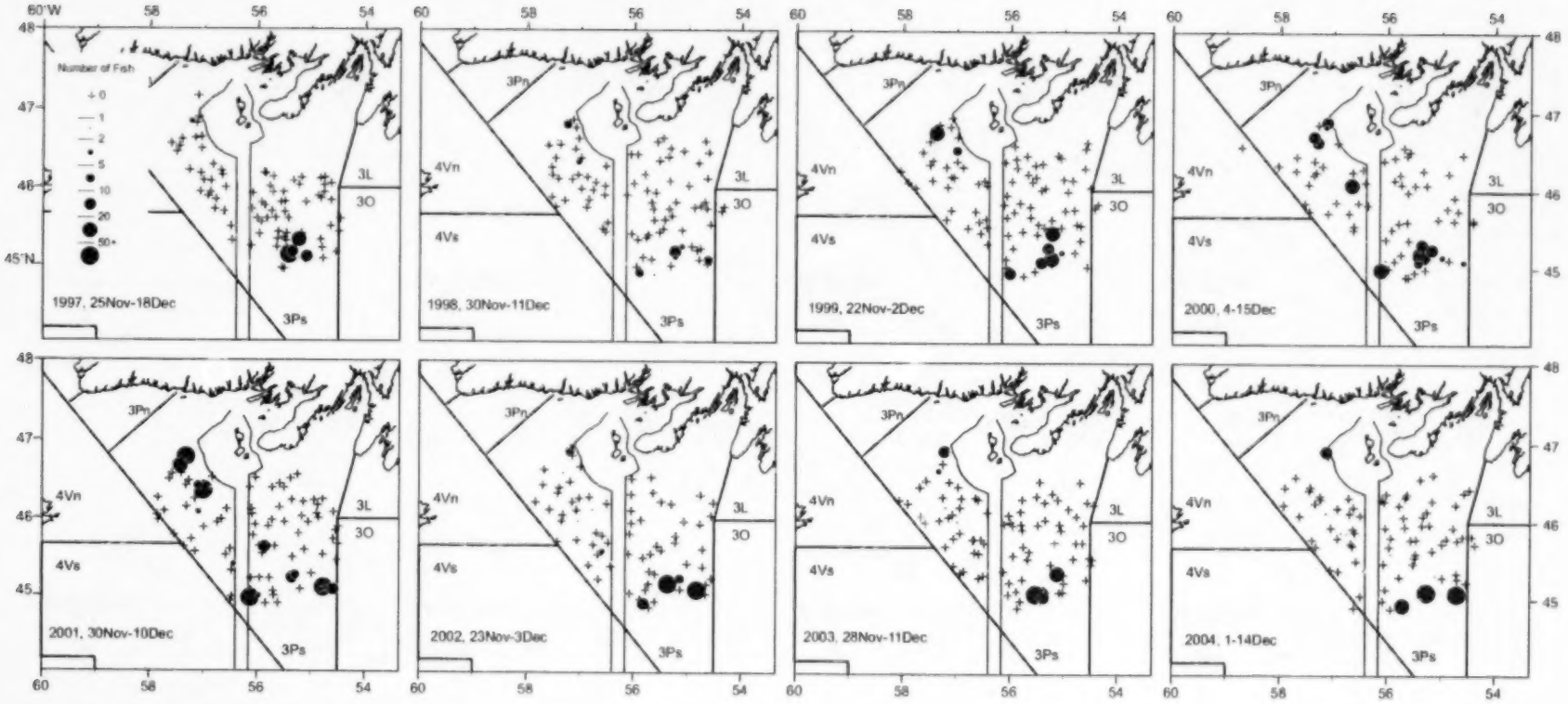


Figure 28b Haddock Catch Numbers Distribution from GEAC Stratified Random Surveys, 3Ps, 1997-2004. 200, 400, and 800 m depth contours are shown.

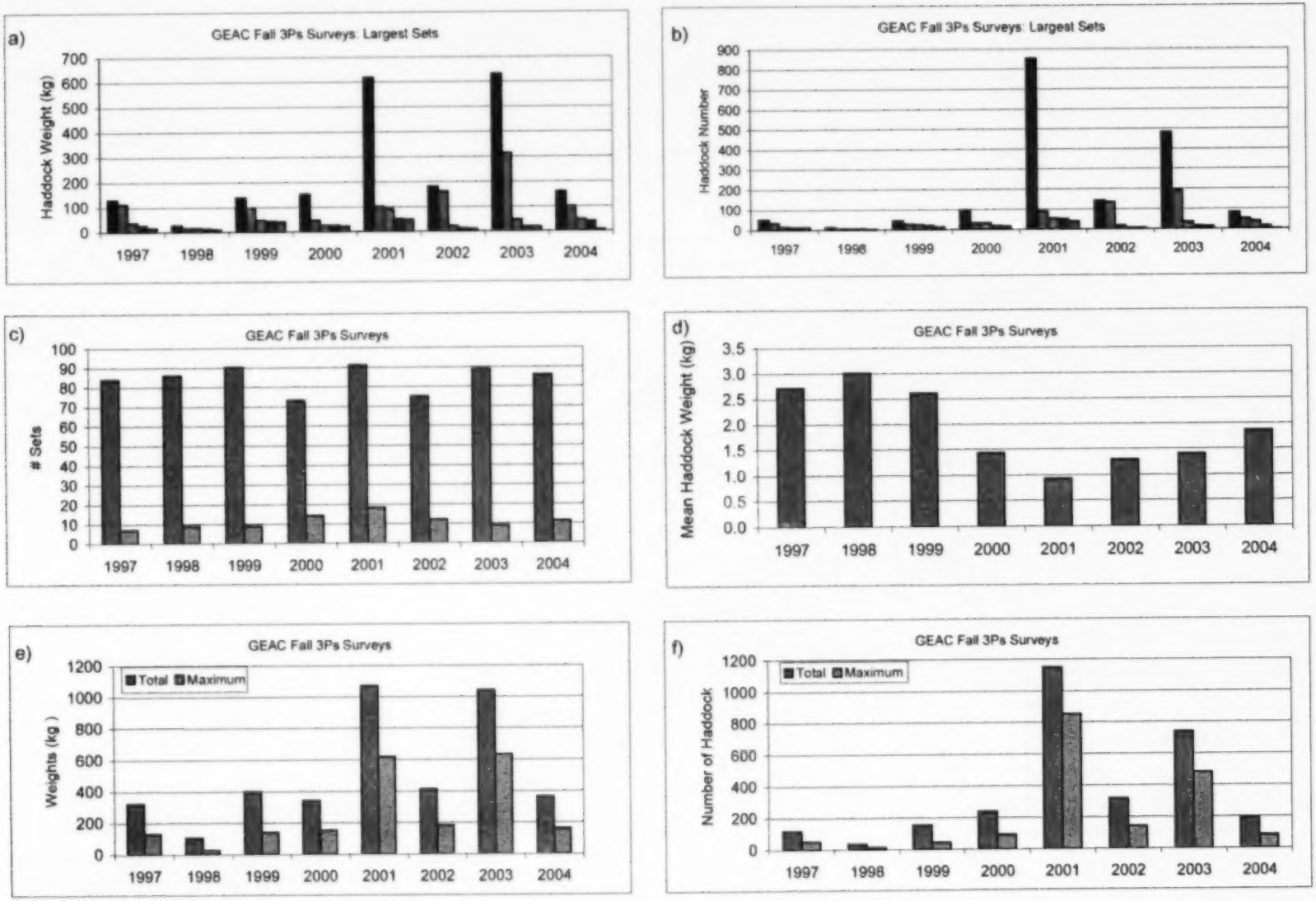


Figure 29 Haddock Catch Summary Statistics: a) largest set weights; b) largest set numbers; c) # sets fished; d) mean weight; e) survey weights; f) survey numbers.

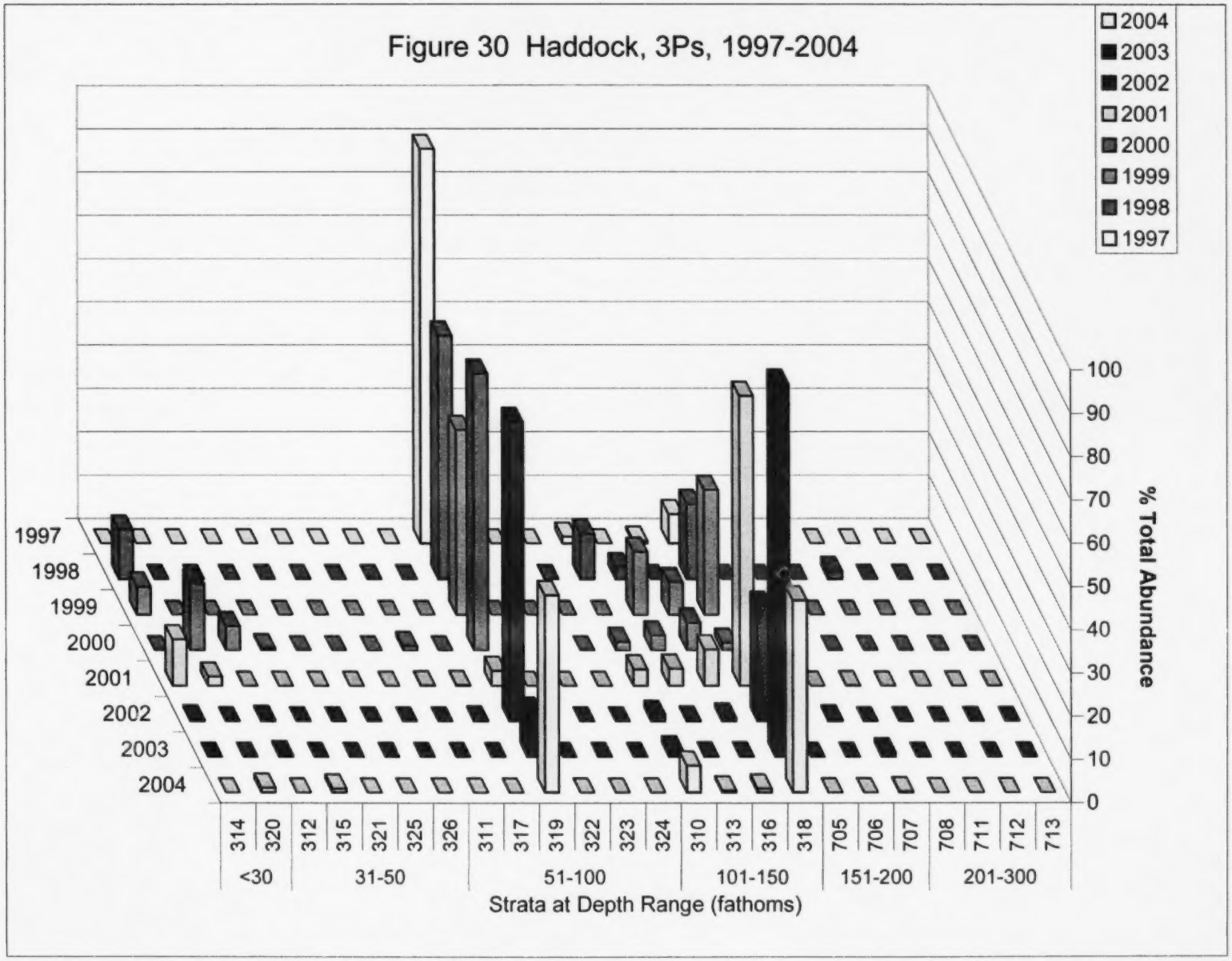


Figure 30 Haddock, 3Ps, 1997-2004
2004
2003
2002
2001
2000
1999
1998
1997
100
90
80
70
60
50
40
30
20
10
0
% Total Abundance
1997
1998
1999
2000
2001
2002
2003
2004
314
320
312
315
321
325
326
311
317
319
322
323
324
310
313
316
318
705
706
707
708
711
712
713
<30
31-50
51-100
101-150
151-200
201-300
Strata at Depth Range (fathoms)

Figure 31 Haddock, 3Ps, 1997-2004, Estimated Abundance

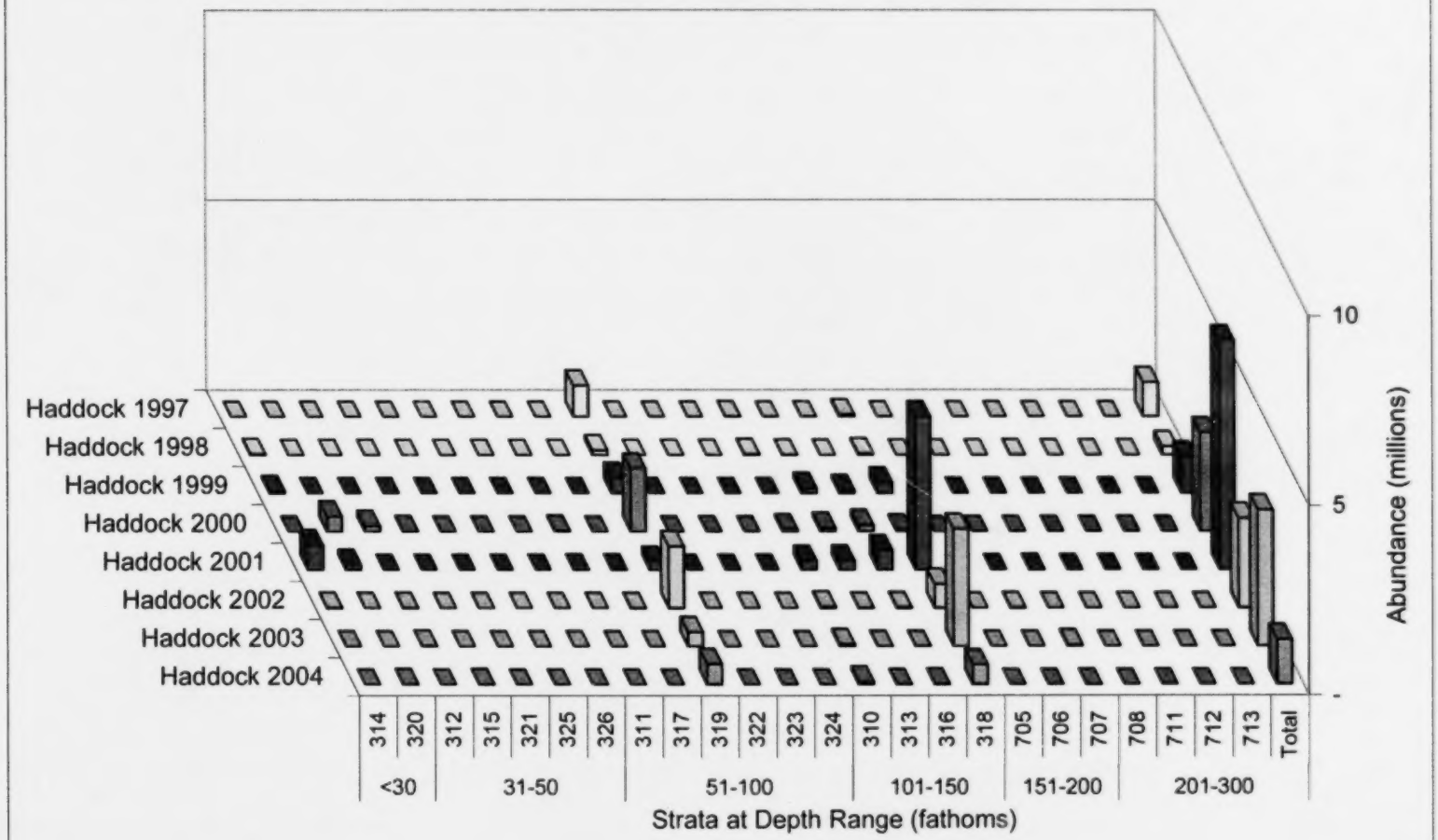


Figure 32 Haddock, 3Ps, 1997-2004, Estimated Biomass

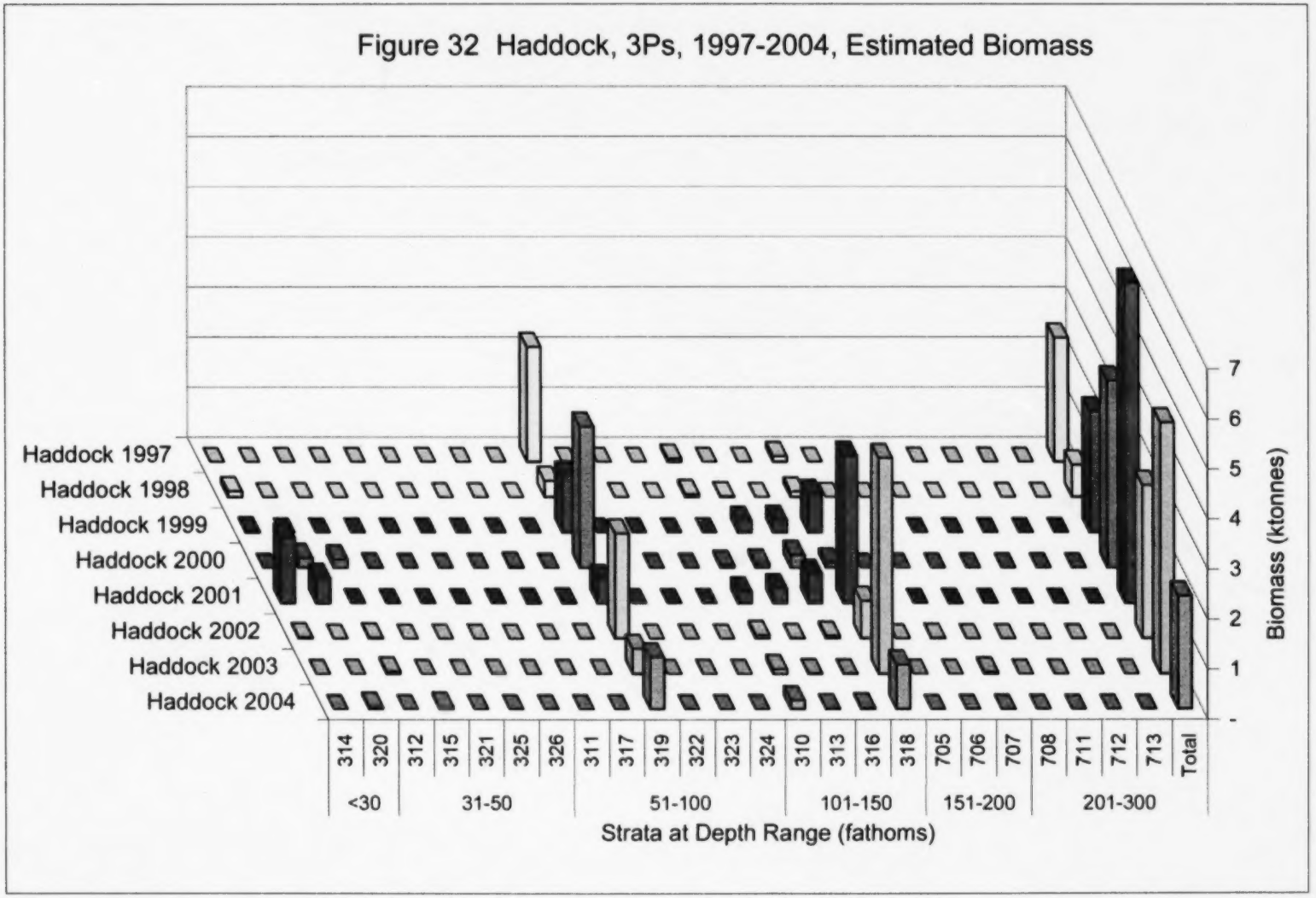


Figure 33 Haddock, 3Ps, 1997-2004, STRAP-estimated Mean Values Per Tow